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Progress in Electrical Industry Shown at Convention

Forty-Third Annual Convention of National Electric Light Association Most Constructive in History of Organization—Comprehensive Reports Submitted — Martin J. Insull Elected President

Out of the turmoil and confusion which was the aftermath of the recent war has arisen a problem which is one of the most serious which has ever confronted the public utilities of the country. It is no longer a question of obtaining business but of obtaining funds with which to finance the extensions necessary to meet the rapidly increasing demands for electric service. That the question of financing is a most serious one was forcefully indicated by the deliberations of the National Electric Light Association at its annual convention in Pasadena, Cal., May 18-22.

Group of N. E. L. A. Men Who Took Active Part in Convention Proceedings — Martin J. Insull of Chicago, the New President of the Association, is Second From the Left.

The convention was in many respects the most important ever held by the association and was a fitting culmination to the highly efficient administration of President R. H. Ballard. Past presidents and other veterans who have attended most of the previous conventions were foremost in their praise of the splendid program of constructive business and of the limitless hospitality of the local committees and citizens.

Close Relationship of Utilities to the Public Emphasized.

Coupled with the appreciation of the seriousness of the financial situation was the realization that utilities are essential public servants and that their salvation lies in close relationship with public sentiment. This fact was crystallized by addresses on Thursday and Friday by E. O. Edgerton, president of the California Railroad Commission, and Carl D. Jackson, chairman of the Wisconsin Railroad Commission, both of which dealt with the importance of improving the bond between the utilities and the public. The relationship between utilities and state commissions was shown in a new and closer light. Both owe their existence to the public and have common obligations. The continuance of regulation depends upon the success of privately owned utility companies.

Both speakers pointed out that public service commissions were serving the best interests of the people by protecting utility investments and making it easy to secure additional capital, although under the present conditions the principal concern of utility companies is to obtain money and to effect operating and service refinements not possible heretofore.

Program Most Comprehensive Presented Before Association.

The question of business possibilities in the electrical industry was by no means neglected. The program of the commercial section proved particularly important. Indicating the tremendous opportunities for additional development was an address dealing with the potential business in the electric furnace industry, which was one of the many important messages delivered to the convention on this phase of business activities.

Over 80 reports and papers were presented at the convention, and with a program so compre-

hensive it was difficult to select any subject of dominating interest. The question of the conservation of coal and the development of water-power resources, presented by the committee on water-power developments at the first general session, was considered by many as the most important feature of the convention.

The reports on railway electrification and on inductive interference dealt with matters of vital interest to the central-station companies. Leading utility executives of the country emphasized the necessity of considering these problems as important subjects seriously affecting the future of the industry.

In addition to the importance of the convention from the standpoint of reports and discussions, it marked significant development in association organization and growth. Changes in the constitution were unanimously adopted which provide a structure for adequately carrying on new and important work planned for the association. Detail work will be done hereafter by the state and geographic divisions, and the national organization, through a strictly democratic form of organization, will be free to give its attention to the big problems confronting the industry. The new section on public relations will be particularly important in this connection.

The report of the committee on membership, Walter Neumiller, chairman, showed the association has 1058 class A, 7069 class B, 89 class C, 447 class D, 1482 class E and 53 class F members. It was urged that the drive for membership in the association be continued.

The officers elected for the ensuing year are as follows: President, Martin J. Insull, Middle West Utilities Co., Chicago; first vice-president, M. R. Bump, Henry L. Doherty & Co., New York City; second vice-president, Frank W. Smith, United Electric Light & Power Co., New York City; third vice-president, Walter H. Johnson, Philadelphia Electric Co., Philadelphia; fourth vice-president, Franklin T. Griffith, Portland Railway, Light & Power Co., Portland, Ore.; treasurer, H. C. Abell, American Light & Power Co., New York City. The executive committee is composed of the following members: E. W. Rice, General Electric Co., Schenectady, N. Y.; Paul Spencer, United Gas & Improvement Co., Philadelphia; W. H. Atkins, Edison Illuminating Co., Boston; R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.; E. M. Herr, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.; P. H. McDougall, Toronto Electric Light Co., Ltd., Toronto, Ont.; E. W. Lloyd, Commonwealth Edison Co., Chicago; R. B. Layman, Wagner Electric Manufacturing Co., St. Louis, and J. R. Owens.

Class D Members to Be Represented on National Executive Committee.

At a meeting of class D members held Friday Executive Manager M. H. Aylesworth described the new organization scheme which provides for three representatives of electrical manufacturers on the national executive committee, which will be the first time in the history of the association that the manufacturers will be so represented. The men elected to represent the manufacturers on the executive committee are: E. W. Rice, General Electric Co., Schenectady, N. Y.; E. M. Herr, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., and R. B. Layman, Wagner Electric Manufacturing Co., St. Louis, Mo.

J. C. McQuiston, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.; George A. Hughes, Edison Electric Appliance Co., Chicago, and Gaylord A. Freeman, Walker Vehicle Co., Chicago, were re-elected members of the board of directors, the holdover members of the board being C. L. Pierce, Jr., Hubbard & Co., Pittsburgh, Pa.; S. E. Doane, National Lamp Works of General Electric Co., Cleveland, O.; F. H. Gale, General Electric Co., Schenectady, N. Y.; Charles Blizard, Electric Storage Battery Co., Philadelphia; John Mustard, Wagner Electric Manufacturing Co., Philadelphia, and James W. Perry, H. W. Johns-Manville Co., New York City.

The value and need of co-operation between all branches of the industry was stressed in both the general and committee sessions, it being generally agreed that in close co-ordination and harmony between all interests lay one of the greatest assets of the industry. William E. Robertson, Buffalo, speaking for the jobbers' association in the last general session, offered the co-operation of that association and said it was anxious and willing to work in the closest harmony with the utility companies. In other sessions many suggestions for closer working relations between the different branches of the industry were made and received favorable comment and attention of the delegates.

Hospitality of the West Shown in Elaborate Entertainment.

Although the convention established a record for business accomplishment, sufficient time was allowed to enjoy the most elaborate entertainment program ever provided for an association convention. Every moment, from the opening reception on Tuesday to the sounding of the gavel at the final session on Saturday, outside of meetings, was occupied by some form of entertainment. The entertainment committee, which was composed of W. L. Frost, chairman; K. E. Van Kuran, C. S. Walton, F. B. Lewis, E. J. Cash, J. W. Burns, E. R. Davis, C. H. Coulter, A. E. Wishon, C. M. Masson, B. F. Pearson, P. H. Ducker and H. N. Sessions, is deserving of the greatest credit for the enjoyable time given to the delegates.

The leading social event of the convention was the president's reception, held in the main lobby of the Hotel Huntington, Tuesday evening, preceded by a ball. In the receiving line were President and Mrs. Ballard and other leaders in electrical and financial affairs accompanied by their wives. The reception was followed by a brilliant electrical display in the hotel gardens, witnessed by the delegates and guests. The display included an electric curtain with illuminated designs. When the curtain was drawn it revealed a presentation of a play in which ballet dancers performed under floodlights. The entire grounds were illuminated with vari-colored lamps, making a scene of brilliance and splendor. Among the other countless entertainment features during the week was the Mission Play Wednesday and a carnival Friday evening.

N. E. L. A. Convention Report

General Sessions

Conditions in Industry Reviewed by President Ballard—Proposed Scheme of Association Reorganization Approved — Reports of the Various Committees Cover Different Phases of Central-Station Field

The first general session was called to order Wednesday morning, May 19, by President R. H. Ballard. He introduced Gov. William D. Stephens of California, who extended a characteristic western welcome. His remarks indicated an unusual understanding of the electrical business and its various problems. He spoke of the electrical developments in California, particularly with regard to hydroelectric achievements, calling attention to the electrical requirements of the state and the imperative need for additional water-power development.

Review of Conditions in Industry Given in President Ballard's Address.

First Vice-President Martin J. Insull took the chair and President Ballard presented his address. He referred to the efficiency in production and increased output of electrical energy by the central-station industry and of the ever-increasing recognition of the indispensability of electric service and its greater application to the various needs of the nation. Increased production and conservation of resources are important world problems, and electricity is playing an effective part in accomplishing both. The public is gaining a better understanding of the aims, purposes and importance of the electrical industry.

Utility companies are vital factors in commercial progress, the public demands service, capital is needed by the industry and the latter should not be handicapped by a lack of it, said Mr. Ballard. A constructive attitude by regulating commissions is necessary, allowing utility securities to be made attractive to investors. Public ownership of the kind in which the public owns stock of utility companies was advocated. Interconnection of plants and transmission lines relegates independent municipal systems.

The economic growth of the central-station industry lies in large and more efficient units of production and their interconnection. Developments of large steam and water-power plants and improvements in transmission of energy have raised new operating problems. New power projects should be studied in connection with existing plants and with a view to interconnection. The latter will save fuel, labor and capital, improve load-factor, and thereby reduce the cost of energy production.

Speaking of railway electrification, President Ballard said the ultimate return on investment in electrification would be generous. Enormous savings of coal would be effected. The central-station industry is vitally concerned with railway electrification.

He emphasized the inadequacy of existing laws on water-power development, stating that three-quarters of the water-power resources of the country were so involved as to discourage development.

In referring to the affairs of the association, he mentioned the plans to strengthen geographic divisions, state associations and the headquarters staff. He also spoke of the plan to divide the work of the association into the public relations, technical, commercial and accounting sections.

In closing, President Ballard emphasized the importance of co-operation of central stations with the various branches of the industry.

Proposed Scheme of Organization of Association Approved.

Treasurer H. C. Abell's report showed the association to be in a sound financial condition, with adequate estimated resources to carry on the work planned.

Executive Manager M. H. Aylesworth presented a brief verbal report in which he told of the importance of the association activities during the year. He mentioned the employment of a superintendent of service whose duty it is to answer questions by member companies regarding operating service. He described the engineering and publicity work now being done at the association headquarters and also the accounting service available to all members. The organization plans were referred to, Mr. Aylesworth stating that there were now 13 geographic divisions embodying the membership of all the different state associations.

The value of association membership was indicated by the citation of the incident of a utility company which became bankrupt, the court, after an investigation, ordering the company to continue its membership in the N. E. L. A.

The reports of W. C. L. Eglin, chairman of the committee on constitution and by-laws, and of H. C. Abell, chairman of the committee on constitutional revision, were presented. The entire constitution has been revised in order to provide for the new scheme of organization, and the revision was approved by the convention.

Rate Committee Recommends Penalties on Loads with High Power-Factor.

The report of the rate research committee, of which Alex Dow is chairman, was presented by R. S. Hall. The work of this committee has been taken over by the association headquarters staff, which is in a position to give better service to the member companies. The report referred to the power-factor clause in rates and pointed out that the American Institute of Electrical

Engineers has undertaken to define such a clause. The action of the committee will be deferred until this definition is available. It was recommended that means be taken to inflict rate penalties on loads of poor power-factor and of unbalanced condition.

Commercial Applications of Electricity Showing Rapid Development.

The statement that increasing costs and the scarcity of labor are resulting in the more general and more rapid commercialization of electricity and electrical appliances featured the address of John G. Learned, chairman of the commercial section. Central-station development is accelerating at a rapid rate. In the industrial field, large amounts of central-station capacity used for war purposes have been diverted to the arts of peace.

Electric furnaces for steel making are now almost a necessity and many have been installed this year for melting brass. Further advances have been made in the application of electrical energy in the reduction of copper, zinc and aluminum, and in the manufacture of nitrates and chlorine compounds.

Electricity for ice making has been developed to such a degree in some places that entire communities are dependent upon central-station service for ice. Industries are employing small electrical appliances more extensively to facilitate production. The demand for electric signs and special illumination has been revived. Electric ovens for clubs, restaurants, hotels and retail bakeries are developing upon a large scale. In the home, the housewife, confronted with the scarcity of domestic help, obtains relief by employing electric appliances.

Attention was called to the unusual demand for electrical appliances and apparatus, which far exceeds the supply, and for the need of commercially trained men to direct the business, as commercial problems at present are fully as numerous and as important as technical problems.

Mr. Learned spoke in general of the work of the section, which is covered in detail in the individual reports of the divisions handling specific matter. As a point of interest he mentioned the fact that the section this month closes the first decade of its existence, during which time growth in importance of the commercial end of the industry is particularly noteworthy.

Survey Discloses Immense Potential Energy of Undeveloped Water Power.

One of the most important, complete and comprehensive reports of the convention was that of the committee on water-power development. This committee is composed of Franklin T. Griffith, chairman; W. A. Brackenridge, John A. Britton, H. T. Edgar, C. C. Egbert, Mortimer Fleischhacker, H. I. Harriman, D. L. Huntington, H. F. Jackson, Frank M. Kerr, A. W. Leonard, J. D. McKee, G. W. Talbot, A. B. West and A. G. Wishon. The results of a most thorough survey, conducted during the past year throughout the entire country, were embodied in the report.

Statistics were given on the present and potential water power of the United States. The latest authentic estimate shows there is approximately 59,360,000 hp. of potential undeveloped water power in the United States, and only 9,823,540 hp. of developed water power. Of the potential maximum power, 68.6% lies in California, Oregon, Washington, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming. Of the total maximum potential water power of the United States, 74.3% represents undeveloped horsepower coming under federal jurisdiction. In the western states 94% of the maximum potential water power is in this class. In other words, practically all of the future development of water power in the western states, covering approximately 70% of the total potential water power of the country, will be dependent upon federal action in the matter of issuance of workable permits for the development of these projects.

Power Consumption of United States.

For purposes of discussion of power consumption, the United States was divided into four districts, New England, Atlantic, Central and Western states. A table was shown giving the population, kilowatt-hours consumption, gross revenue, kilowatt-hours per capita, cost per kilowatt-hour and revenue per capita. The total for the United States shows a population of 109,843,000. The consumption in millions of kilowatt-hours is 36,734.7. The gross revenue in millions of dollars is 773. The kilowatt-hours per capita is 334. The cost per kilowatt-hour is $0.0212. The revenue per capita is $7.05.

Figures were given by districts to show that the per capita use of electricity in the far western states is 2.21 times that of the remainder of the nation. It was shown that while distances are vast in the western section, the development of long-distance hydroelectric transmission has made possible electric power rates that are extremely low, averaging 1.65 cents per kw-hr., as compared with 2.19 cents per kw-hr. elsewhere in the country.

In the discussion of potential water power the state of Washington was given first place with 9,500,000 hp., or 16% of the total potential water power of the United States. California was shown a close second with 9,250,000 hp., or 15.6% of the total. Oregon ranks third with 7,100,000 hp. The Pacific coast states together represent 43.6% of the total potential maximum water power of the United States. Including Idaho and Montana, these five typically western states represent 61% of the total potential maximum water power of the country, with a total of 36,210,000 hp.

Contemplated Water-Power Development.

Reference was made to contemplated developments in eastern states. More than 1,000,000 hp. is contemplated in Alabama, North Carolina, Georgia and Maryland. Electrification of the western trunk line railroads will require development of a portion of the water power in that territory.

Data obtained from 52 power companies of the far western states, showing their loads during the past ten years, and also their estimated

loads up to and including 1928, were obtained and compiled for presentation in the report in connection with graphic charts. They show that during the next ten years the expected development of power in the West will rise to the vast total of 1,776,260 kw. At the present prices for material and labor this improvement will involve an investment of over $700,000,000.

Discussing the pooling of resources and interconnection of central-station systems, an arrangement which was resorted to largely during the war, further development under peace conditions was urged as a logical step in the evolution of power development. It was noted that the country has passed successively through the periods of the isolated plants and the individual central-station plant, with its more or less limited distribution lines. It is now in the period of the central station system of a number of generating plants—hydro and steam—connected to the network of the unification of the power resources of large subdivisions of the country.

In discussing the report, John A. Britton stated that there was an enormous amount of waste in burning oil in steam plants when so much undeveloped water power is available. A. E. Wishon pointed out how hydroelectric development will benefit all branches of the industry as well as the public. W. C. L. Eglin stated that it was the duty of utility companies to aid in conservation, and said that a tax on all non-condensing engines seemed advisable.

Extensive Developments Are Forecast by the Lamp Committee.

There is evidence on every hand of an awakened interest in the subject of lighting and a new appreciation of what it is capable of doing for the user. When proper consideration is given by the user to the importance of proper lighting, we may look for a new standard throughout the country, according to the report of the lamp committee, of which F. W. Smith is chairman.

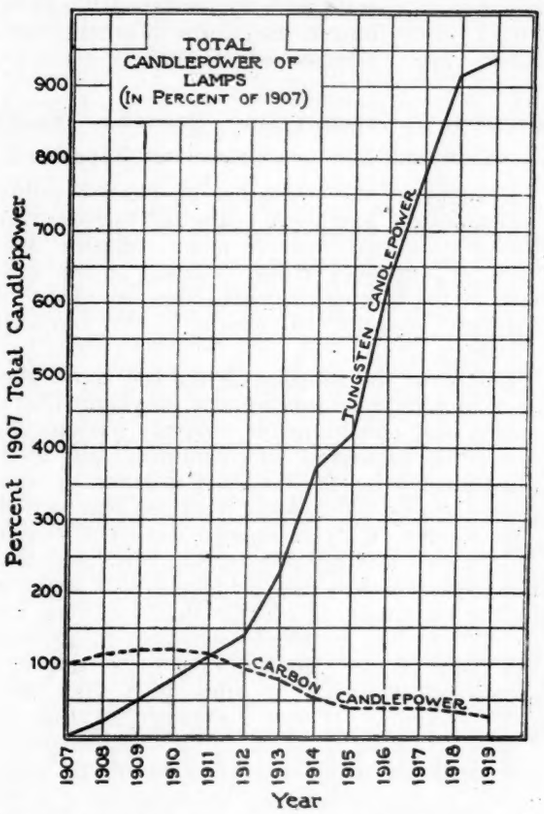
A demonstration including six complete lighting systems and auxiliary apparatus, offering comparisons of antiquated and modern factory lighting systems, was given by the lamp committee in support of its annual report on electric lamp developments during the past year.

The 50-watt vacuum tungsten lamp was recommended as an excellent lamp for general lighting purposes, as it is the most powerful and the largest lamp, of dimensions equivalent to those of the old 16-cp. carbon lamp, which can be used in all shades and equipment of early manufacture. The 40-watt lamp was reported to be the most popular, with the 25-watt lamp a close second.

Gas-Filled Lamps Becoming Popular.

Each year there is recorded an increase in the average candlepower of lamps sold. This advance is due in part to the utilization of high-power gas-filled tungsten lamps in service formerly performed by either smaller electric lamps or by other illuminants, and in part to the increasing illumination standards which are becoming more prevalent. The accompanying illustration shows, for the period of 1907 to 1919, the average annual candlepower, watts and efficiency of all lamps sold. This shows a mean of 53.2 horizontal candlepower for 1919 in comparison with 51.5 for 1918; a mean wattage of 51.5, as compared with 52.7 in 1918, and a mean efficiency of 10.5, as compared with 10.3 lumens per watt in 1918. The decrease in average watts was probably brought about by readjustment of war industries in which high wattage units had been used very largely.

The mill-type lamp introduced some months ago has been developed into a satisfactory unit



Curves Showing Growth in Use of Light From 1907 to 1919.

which has attained considerable success in displacing carbon lamps in service where rough treatment is received.

The 50-watt gas-filled white Mazda lamp for 110 to 125-volt service, although its efficiency is slightly lower than that of the 50-watt vacuum-type lamp, has attained a considerable measure of success, approximately 3,000,000 lamps of this type having been distributed during 1919.

The bowl-enameled lamp has a considerably lower brightness than the bowl-frosted lamp; in other words, it gives better diffusion and can be viewed with a greater degree of comfort. Dirt on the surface of the bowl enameling does not have as serious an effect as dirt on the bowl frosting because less of the light is transmitted through this part of the bulb.

Prevention of Fires from Electrical Causes by Education of the Public.

Education of the public as to the use of electrical appliances is the only method of correcting their abuse, stated the report of Insurance Expert W. H. Blood, Jr. He referred to the

statement of an insurance actuary that if the careless use of electric flatirons and indiscriminate extensions made with flexible cord by unskilled persons could be avoided, the fire losses resulting from the use of electricity would then be next to the lowest in the list of some 28 causes of fire which the National Board of Fire Underwriters classified.

Progress along this line is marked by the New Jersey law making it compulsory throughout the state for all schools to provide a course in fire prevention. The association was urged by Mr. Blood to co-operate with the National Board of Fire Underwriters in its efforts to secure compulsory fire prevention education.

Employes' Organizations Desirable, States Company Sections Committee Report.

Changes in the personnel of electric utility companies the past three years and the need for fostering mutual interest make company sections, or employes' clubs, essential to the welfare of the industry reported the committee on company sections, of which F. A. Birch is chairman.

Following the adoption at the last convention of a constitutional amendment providing liberal membership conditions for company sections, the committee organized subcommittees and instituted a campaign for the reorganization of company sections disbanded during the war period. The results of this campaign have not proven satisfactory and an investigation disclosed that the original plan is now inadequate. It seems to be the consensus of opinion that employes' organizations are especially desirable at present, but there is a tendency toward organizing employes under names or titles other than company sections. It was recommended that all forms of employes' organizations be recognized, irrespective of title, and that a bureau be established at the association headquarters for the care of company sections and assistance to the committee.

Possibilities for Central-Station Service in Electric Furnace Field.

An address on "The Use of Central-Station Power in Electric Furnaces" was delivered by Robert M. Keeney, director of the department of metallurgical research, Colorado School of Mines. He pointed out the great possibilities for central-station service in the electric furnace field, stating that over 200 companies in this country have furnace loads that are considered very desirable. Electric melting of steel and scrap to produce low-grade pig-iron has a big future in the western states.

There are 875 electric furnaces in the world, of which 363 are in service in the United States of total capacity of 1600 tons, with an input of 600,000 kv-a. The production of electric steel in this country totaled 500,000 tons last year.

Electric furnaces have a poor load-factor, but this is due mainly to poor operation, the tendency in design being to increase the demand input per ton. Heavy reactances are being eliminated.

Speaking further of the relation of the electric furnace to central stations, Mr. Keeney said small furnaces operating 24 hours per day should be encouraged. He also referred to the development of brass melting by electricity.

W. C. L. Eglin presented a resolution that Mr. Keeney's paper be printed in the association *Bulletin,* which was adopted.

Possibilities of Central-Station Service Outlined in Paper by S. M. Kennedy.

Every member of a public utility force is valuable to his company only in proportion to his ability to serve the company's customers, said S. M. Kennedy, Southern California Edison Co., in a paper he presented on the subject of "Service." Each employe should have a clear answer to the question, "From the consumer's standpoint, what is the best way to do the work assigned to me?"

The great majority of people have only a vague conception as to what a kilowatt-hour is and what it can be made to do. It would seem that educating its consumers as to what they may get out of their electric service is thus giving them a little more—a little better service.

There should be a continuous campaign of public instruction through every available medium, to show that electric service may do, and the possibilities of its freer and more extended use. Information should be sent broadcast that consumers may have, without charge, the expert advice of the company's illuminating, power and heating engineers, that the company's customers and the public have at their command a free consulting service in the uses of electrical energy.

Some of the major forms of service were brought out in Mr. Kennedy's address. Courteous, efficient handling of complaints, whether they are justified or not, does much to keep the company's position strong. It is the business of the good central-station company to cater to the public and anticipate its wishes. Rate schedules of the simplest form help the customer to understand how his bill is figured, which is one of the points about which he is most desirous of being informed.

Installation of a wireless system of communication to distant power houses and switching stations was suggested as a means of minimizing interruptions in transmission, since telephone service is likely to be deranged by the same causes which affect power transmission.

Commissioner Speaks of Efficiency of Central-Station Service.

E. O. Edgerton, president of the California Railroad Commission, gave an able address, under the title of "Reward for Efficiency," in which he discussed the problems of public utilities. He said utility operators are public servants and must be kept on a sound basis. A fair capitalization, which should be used in establishing rates and determining earnings, should be the result of agreement between utility companies and commissions. Interest on securities should be guaranteed to investors through established cash surplus.

Referring to the need for rewarding ef-

ficiency, Mr. Edgerton held that the entire organization of a utility company should receive reward. He emphasized the value of the company having the support of its employes and of avoiding labor troubles by giving fair consideration to all alike.

In closing, he said the continuation of public service commissions depends upon the maintenance of privately owned utilities, and urged consideration of the subject of unification as an added safeguard for good service.

Committee on Electrical Resources Recommends Collection of Data.

Electrical energy in excess of 25,630,700,000 kw-hrs. was generated by 6542 central stations, including municipally and privately owned plants, with a total of 8,994,000 kw. capacity of generators, and sold for a total of $502,060,000 to 7,578,000 customers, according to advance information from the U. S. Census of 1917, contained in the report of the committee on electrical resources of the nation, presented by M. S. Sloan, chairman.

New properties and expansions of then existing properties have greatly increased this output and projects under way and contemplated will still further increase it, but reliable data and statistics are not available. Therefore, the committee recommended that the association undertake, in co-operation with the Council of National Defense, the collection and publication of the real productive condition of the electric power industry of the country. This recommendation is made particularly urgent because of a resolution adopted by the Council of National Defense, consisting of the secretaries of the Departments of War, Navy, Interior, Agriculture and Labor, requesting the collection of statistics of the central-station power plants, the demand upon them, their capacity, reserves, outputs, interconnections and transmission and distributing systems, both for the education of the public and the economic development of the country, and as a necessary measure of national defense.

That such a continuous census is essential if the power industry is to demonstrate to the several public utility commissions and to the government that the amount of reserve capacity is impaired and that some method must be devised by which the industry can secure funds with which to increase the reserve capacity was asserted by the report.

Statistics on Privately and Municipally Owned Plants.

These statistics were made even more interesting by their division, in the report, between privately owned plants and municipally owned plants, as follows: The census figures showed 2318 municipally owned plants and 4224 privately owned plants; the municipally owned plants generated 1,039,300 kw-hrs. from 582,000 kw. capacity of generators and purchased 192,500,000 kw-hrs. of energy, while the privately owned plants generated 24,398,900,000 kw-hrs. from 8,412,000 kw. of generators. The municipally owned plants sold their energy for $39,586,000 to 976,000 customers, while the privately owned plants sold their energy for $462,474,000 to 6,602,000 customers. Thus the municipally owned plants in the year the census was taken sold only 4% of the total power output to 13% of the total customers, but they received 7.9% of the total income.

It is estimated that at the beginning of 1920 the capacity of all central stations in the country is between 10,000,000 and 11,000,000 kws. and that the output for 1919 was 33,000,000,000 kw-hrs.

The report stated that in nearly all municipally owned plants insufficient allowances were made for replacements, etc., so that the new investment required for expansion and for replacement of wornout apparatus amounts to more than the cost of the plants as they stand on the books today. Exhaustive researches in Massachusetts in investigating municipal plants show that the rate of taxation in cities where municipal plants are operating has been somewhat higher in the past decade than in cities where private plants are operating, but it was not clear that this was altogether due to municipal activites, either in electric or other plants. Investigations made in Oklahoma by Professor Bozell, now of Yale, of 23 small municipal plants in a comparatively new and struggling state, showed that each of these towns owed $85,000 for its water and light plants, each of the 59,823 inhabitants owed $82.30 of this amount, and that each inhabitant paid annually $2.07 whether he used water and electric light or not. Interest and replacement charges were added to arrive at these figures, but no allowance was made for taxes.

Recommendation that state utility commission control be extended in all states to cover municipally owned and operated electrical utilities, just as privately owned electrical utilities are regulated, was recommended by the committee in its report. This would place the two classes of utilities on a more nearly equal basis, since then proper charges for taxation, replacement, etc., would be made by the municipal plant as well as by the private plant.

Need of Greater Publicity Is Emphasized by Commercial Section Bureau.

The immediate need for greater publicity in central-station company matters through the magazines and press was pointed out in the report of the advertising and publicity service bureau of the commercial section, of which L. D. Gibbs is chairman. The advisability of the recognition of the motion picture as an advertising medium was also discussed in the report, which embraced the reports of several divisions of the bureau.

Particular stress was laid upon the necessity for co-ordinating the campaigns of central-station companies throughout the country in order to derive benefit for all the industry through the psychology of what might be termed "barrage" advertising in newspapers and magazines, the same general advertising being used simultaneously in all sections of the country, varying in detail as local conditions demand.

The motion picture films division of the bureau, of which Charles H. Pierson is chair-

man, called attention to the fact that, while there must be a large amount of waste in the printed words, because readers do not read carefully or do not properly interpret all matter placed before them, the visualization of electrical activity on the screen impresses itself upon the minds of all who see the production. The number of people reached through motion pictures is smaller than the number reached through the press or magazines at present, but, nevertheless, it is urged that definite and directed activity be used with a view to bringing about some method of using the motion-picture industry more generally in electrical advertising.

The adequate outlets division called attention to the "Adequate Convenience Outlet Campaigns" that are now in force in California and several other parts of the country. One feature noted is the success attending the plan to have manufacturers show their products connected to convenient outlets.

The use of modern electrical appliances in advertising illustrations used by general commodity manufacturers has been successfully urged by the national commodity advertisers' division of the bureau, of which Earl E. Whitehorne is chairman. Through this means makers of soap are illustrating their wares being used in an electric washing machine, coffee importers are showing their coffee being made in an electric percolator, etc.

Publicity articles have been placed before company-members' executives, and "feature" articles prepared by a woman writer on household economics have been published in magazines and newspapers by the news syndicate and magazine writers' division of the bureau, which is headed by Frank B. Rae, Jr., as chairman. The division feels that this field should continue to be used to an even greater extent than in the past.

The report of the publication division, of which Cyril Nast is chairman, showed that 887,550 copies of publications issued by the association during 1919 were sold for advertising purposes and that approximately the same number of copies of pamphlets and booklets are being prepared for the fall and winter advertising campaigns of 1920.

Educational Courses an Aid in Obtaining Well-Trained Employes.

Educational courses in commercial engineering, practical electricity, elementary and advanced accounting, conducted under the auspices of the N. E. L. A., and this year thrown open to others than members of the association for the first time, have been well received and have assisted companies materially in securing trained men and women, according to the report of the committee on education, of which Fred R. Jenkins is chairman.

Leaders in the electrical industry, whose aim is to serve the public, are convinced that education of employes to better fit them for their work and to stimulate their interests is a fundamental necessity of its development. The courses were offered to the public in response to many requests from allied industries and from educational institutions. General theories and their particular attention to the central-station industry are covered in the courses.

Courses in Accounting Education Prove Popular to Students.

That students throughout the country are eagerly seeking the educational courses on the electrical industry was evidenced by the report of the committee on accounting education, of which Douglass Burnett is chairman.

Sales of these courses have amounted in the past two years to $20,238.43. There were 1102 subscriptions made to the elementary course and 112 to the advanced course. It was reported that 300 elementary sets and 400 advanced sets are in stock for sale to students.

The advanced course was reported still in process of preparation, with the first 25 lessons printed and the last 11 lessons in various stages of authorship. Work on the previously determined schedule of advanced lessons, perfecting details, has been actively prosecuted and is ahead of students' requirements.

These courses were considered by the report as the most substantial effort to formulate the best accounting practices yet noted for any specialized industry. Engaged in this work are 13 expert authors within the industry and three expert authors without the industry, while five editors have reviewed them.

During the past two years the expenses of this work have amounted to $22,320.75, including material now in stock. While this shows a net deficit of $2,082.32, and there will be further expense in the preparation of the balance of the lessons, it is expected that future sales of the courses will show a reasonable net surplus for the advancement of accounting education. Company managements are depended upon to exploit the courses among employes.

The discussion on this report and also that of Chairman Jenkins was brief, the consensus of opinion being that the educational work should be continued, as the need for trained men was greater now than ever. The experiences of several central-station companies was recounted.

Inductive Interference an Important Central-Station Problem.

The technical and hydroelectric section was referred to by I. E. Moultrop, chairman of the section, as a body of men probably superior in ability to any like number which could be gathered together anywhere. He described briefly the growth of the section from a position of minor importance and limited scope to a position of great value and of high professional standing.

The need of a large amount of research work was called to attention and specific mention was made of the needs of the committee on inductive interference. This committee is confronted with the solution of inductive-interference problems in all sections of the country and has but little information in hand to work with. It was Mr. Moultrop's opinion that inductive interference presented the largest single technical problem for the central-station industry to meet at the present time. It will be essential to co-ordinate and harmonize various interests and practices in order to present a definite solution of the prob-

lems involved either to regulating bodies or to the telephone interests. An appropriation of not less than $25,000 a year, for a period of several years, was suggested as essential to the satisfactory functioning of the committee. An engineer has been engaged permanently as a part of the headquarters organization to help in this and other technical work.

Co-operation Is Planned by Committee on Inductive Interference.

With advances in the art, the efficiency of telephone circuits and apparatus has increased with attendant increase in their susceptibility to inductive influences. This, together with the application of phantom circuits and other methods of transmitting increased telephone traffic, has made more difficult the inductive interference problems concerned. The report of the committee on inductive interference, of which A. E. Silver is chairman, pointed out the manner in which it is hoped to take care of this particular situation.

THE NEW ENGINEERING BUREAU.

An engineering bureau has been provided for and is expected to co-operate with all parties concerned in the solution of the various problems involved. The work of the bureau is intended to include the following: Assist in the study of active inductive interference problems; assist in connection with projected property extensions, in a proper advance consideration in co-operation with other parties at interest, with the aim of avoiding possible later interference difficulties; devise suitable methods of quantitative measurement of inductive interference and give attention to such other investigation and research as may be found necessary; give attention to the characteristics of apparatus, of circuits and of arrangements thereof, with a view to eliminating or reducing disturbing influences or susceptibility thereto; compile and maintain for ready accessibility the more essential technical and legal data pertaining to the inductive interference situation; maintain contact with other associations or organizations having an interest in the inductive interference situation; assist in court actions, commission hearings, inter-company adjustment of claims, or similar proceedings, by consultation or by presentation of technical or legal facts or in other ways; formulate a code of working principles as a guide for member companies in meeting inductive interference problems.

Technical material, based on actual operating experience, has been accumulated and probably will be printed at a future date. The data at hand comprises 300 responses to a questionnaire, about 100 of which included considerable detailed information.

The report indicated that interference problems due to low-voltage, a-c. circuits or to street-railway circuits were, as a rule, simple and inexpensive. The interference problems in connection with high-voltage transmission lines are often complex and not easily soluble. In giving specific cases it was shown how a voltage ripple in a d-c. generator caused one case of trouble that was solved by means of a resonant shunt. In the case of a 110,000-volt, 60-cycle line the solutions proposed involved a great amount of expense and other angles of the problem are still being examined for a better procedure.

G. E. Quinan presented a supplemental report which also emphasized the importance of unity of action on the part of central-station companies, which should advance policies comparable with those well defined by the telephone companies. Inaction in this direction will eventually restrict central-station business. J. A. Britton indosed the importance and said the subject can be ignored no longer, for the very foundation of transmission practice is being threatened. Executives, as a rule, think too lightly of engineering problems. D. L. Huntington and M. R. Bump both pointed out how the question of inductive interference affects all companies.

N. S. Warren, American Telephone & Telegraph Co., explained that telephone companies were interested in the subject because interference affects their service. He expressed the opinion that the matter could be satisfactorily handled by co-operation and not by legal battles or competition of engineering skill. J. B. Taylor closed the discussion, urging study of the subject and an equitable division of responsibilities between telephone and power companies.

Government Ownership No Cure for Present Ills of Public Utilites.

From 65 to 75% on the average of all capital furnished for public utility construction comes from those who have taken the public utility securities, like mortgages and bonds, as an investment and not at all as a speculative matter, according to Carl D. Jackson, chairman of the railroad commission of Wisconsin, in his address on the "Trend of Regulation," presented May 21.

This necessary capital, Mr. Jackson believes, will be secured more readily, and in the future on more reasonable terms, when the investing public can feel that the value of the utility is sufficiently stable to offer the securities purchased a sound basis of protection.

"Regulation must not only perform its functions of securing to the public fair and reasonable treatment in all matters of service, safety and rates," the commissioner said, "but must also broadly exercise its general functions to encourage and reasonably reward those supplying the energy, enterprise and capital, without which the highest development is impossible. The industry must be attractive, or it will not flourish. Representing the public on the one hand and encouraging and adequately rewarding the enterprise on the other, often present problems which are not so easy of solution as may appear to those who see the problem from one side only."

The present problem is to meet the extraordinary, threatening and sometimes discouraging conditions in relation to public utilities. The present extraordinary interest rates for public utility securities, intrinsically sound, are a great handicap to extension and necessary development. These interest rates, partly the result of economic conditions and partly the result of governmental fiscal policy that in the end must

break from its own weight, must be paid until conditions change, according to Mr. Jackson.

The question of fair value has assumed increased importance in the last year or two because of the great and rapid change in price level of all unit costs entering into construction. The assignment of a constantly fluctuating value to property devoted to a public use has nothing to recommend it from any point of view, according to Mr. Jackson. Average unit prices over a series of years will again bring about a reasonably close relationship between reproduction cost and investment, and eventually over a period of years the investment and reproduction costs should closely approximate each other.

There are no virtues, it was urged, in short-term franchises which are not fully present in the indeterminate permit. This permit recognizes the investment made and does not subject it to unreasonable hazard of elimination at stated intervals. It also can provide for that full measure of protection of the public interest in matters of rates and service that can be exercised periodically in the short-term franchise.

It is Mr. Jackson's opinion that the problems of central plant establishment and management, at present at least, call for the play of those economic elements least likely to be found under governmental ownership and management.

"There seems to be little movement toward municipal acquisition or ownership in the electrical field in the territory which I am most familiar with, even for local distribution," said the commissioner. "On the other hand, there has been some abandonment of municipal systems in order to take advantage of the economies of the larger central plants. The government should undertake those functions which it is best fitted to perform. It should enter into the business field only when that field presents peculiar municipal problems, and when developments has brought about such a degree of efficiency in business management connected with municipal affairs that those in charge will be men of ability peculiarly fitted to handle the problems undertaken."

J. A. Britton, H. C. Abell and S. Z. Mitchell discussed the address, commenting on the fair attitude assumed and stating Mr. Jackson's remarks reflected a new relationship between utilities and commissions. A motion was passed to have the address printed and sent to all members and commissions.

J. W. Lieb presented the report of the committee on gas and electric service, which is still functioning at Washington. He reviewed the activities of the committee during the war period and recently in connection with fuel shortage and railroad congestion.

Committee on Railway Electrification Submits Comprehensive Report.

One of the most important subjects to come before the convention was the electrification of steam railroads, and the report of the committee was submitted by Frank M. Kerr, chairman. According to the report, if all the steam railroads in the country were electrified with power furnished from large steam generating electric stations, the total fuel required would be equivalent to 53,500,000 tons of coal, as against the actual figure for railroad coal used during the year 1918 of 175,000,000 tons. By electrification 122,500,000 tons of coal would have been saved. Even if power necessary to run the railroads were furnished from electric generating stations using coal for fuel and with a large part of the power supplied from water-power plants, the saving would be considerably increased.

The experimental stage of railway electrification is past. The Chicago, Milwaukee & St. Paul Railway Co. and the Montana Power Co. have demonstrated in Montana the entire practicability and great superiority of electric power for the operation of a heavy trunk line railway. Trains go up and down heavy mountain grades under perfect control, at speeds never known before and with a regularity which is phenomenal. The demonstration of electric operation in the Northwest has been so satisfactory that the question of its application to other roads is a matter only of securing the necessary capital to make the application possible.

The change from steam to electric operation means more than a mere change in type of locomotive used. It means a change in the entire conception of the art of railroad transportation. In short, by adopting electrification, the railroad company is relieved entirely of the business of generating power.

The energy required for railroad electrification can best be supplied by the power companies of the country. Those who have made the production and application of electrical energy their business should take up its application to transportation with the same vision and energy which they have used in applying electric power in other industries. There seems to be no doubt that the energy for railroad electrification can be supplied by the power companies on more favorable terms than can be obtained by the railroad in any other way. The power companies have had years of experience in the application of electric power and understand its capabilities.

W. C. L. Eglin, Frank W. Smith and J. A. Lithipe briefly discussed the report, urging standardization of systems. A. H. Babcock, Southern Pacific Railway Co., said the greatest need was the education of railway operating staffs. Electrification must be discussed with them in railroad language. Executives are aware of conditions and the future of electrification rests with the operating men.

Health Preservation and Accident Prevention Part of Safety Plans.

The part played by leaders in the American electrical industry in promoting the greatest possible safety for their workers was shown in the report of the committee on accident prevention, Charles B. Scott, chairman. A record of successful effort in preventing accidents was coupled with the striking statement that illness must now be reckoned with as a greater menace than injuries. The same forces that have made working conditions safer must now be directed toward improving health.

Records of two large member companies show that while injuries decreased from 422 and 732 in 1916, to 238 and 595 in 1918, sickness in-

creased from 2853 to 3150 in 1916 to 4690 and 5324, respectively, in 1918. The accident prevention committee, during its seven years of existence, has continuously studied causes of accidents, made recommendations for their avoidance, and has prepared rules for workers on electrical apparatus and wires. A concise set of fundamental rules was included in the 1920 report.

Before men are permitted to work on transmission lines, particularly on high-tension lines, it must be shown beyond doubt that the lines are "dead," that they carry no electrical energy from unexpected sources. The committee report gave methods for such tests and precautions to be followed. Rubber gloves are among the most important articles contributing to the safety of linemen. They should be tested frequently at regular intervals. Simple equipment for this purpose and its operation were described.

The lineman depends on his safety belt, on which there was very little standardization until two years ago, when the accident prevention committee submitted specifications for reliable belts, to be used in ordering this equipment. The 1920 report gave more definite specifications, embodying later suggestions. Leather scarcity has promoted the use of canvas webbing, which is more general in Europe than in the United States.

Familiarity with the prone pressure method of resuscitation has resulted in the saving of many lives after severe electrical shocks. The committee has prepared rules, promoted classes and instruction in this form of rescue work.

Central-station companies were urged to see that all apparatus which may become electrically energized above more than normal voltage is permanently and effectively grounded, and that all secondary systems and lighting arresters are properly connected to earth and properly maintained. Adequate lighting of all company property was emphasized as a safety and efficiency measure. Some points most naturally overlooked were called to the attention of the electrical utilities, who should, above all other industries, have unsurpassed illumination.

Elimination of Red Tape in the Handling of Complaints Is Planned.

Prevention of complaints rather than merely rectifying causes of complaints, and the necessity of having thoroughly trained employes of pleasing personality deal with the public were stressed in the report of the committee on commercial service and relations with customers, of which R. F. Bonsall is chairman. During the past year the main work of the committee has been in the elimination of red tape in the handling of orders for the connection and disconnection of service and in handling complaints.

A real desire to serve should permeate such a service organization, stated the report, and the value of service efficiently rendered should be kept constantly before departments engaged in serving the public. As an incentive to the ambitious men a definite line of promotion should be established, which would require the candidate to study the rates and policies of the company, and apply them, in order to receive recognition. The central-station industry as a whole must recognize the value of a trained employe in this field, if the same success is to attend the efforts of these good-will departments as is manifested in other departments where advanced training has always been a requirement.

Of paramount necessity is accuracy in all dealings with customers, because the very nature of the business requires that the customer have absolute faith in the good will and the accuracy of the company in the matter of bills rendered and service furnished, otherwise an unsatisfactory situation will exist.

Activities in Electric Vehicle Field Reviewed by Section Chairman.

Reviewing the activities of the industry during the past year, George B. Foster, chairman of the electric vehicle section, said that the records of output have been eclipsed, in some cases as high as 300%, over any previous year. He said that while these activities were not so strong with the pleasure car, the commercial vehicle is making rapid strides forward.

Immense Field for Application of Electric Handling Machinery.

Installation and operation of electric machinery for handling all kinds of materials in factories, depots, terminals and other industrial and commercial places offers today the greatest potential field for development in the industry, according to Zenas W. Carter, secretary of the Material Handling Manufacturers' Association, New York City, in a paper on "Electric Machinery for All Handling—An Opportunity."

Only 5% of the potential demand for handling machinery has been met, it was declared, and since 85 to 90% of all such machinery is electrically operated, the vast opportunity is obvious.

A recent survey was cited to show that, in the industrial field alone, there is a potential demand for 214,464 units such as industrial trucks, tractors, locomotives, portable conveyors, electric hoists, etc. As each of these will require at least one motor, it was estimated that they would consume an average of 1 kw-hr. each, or 8 kw-hr. each per day—a potential sale of 514,713,600 kw-hr. of electrical energy per year of 300 days.

Only 15% of the steamship docks and 25% of the railroad terminals are properly equipped with material handling devices, it was reported. It was estimated that the port of New York alone, if properly equipped with electric cranes, would require 3000 cranes and hoists with a potential energy consumption of 20,000,000 kw-hr. per year. For a country-wide system of freight transfer, such as is in use in Cincinnati, it was estimated that nearly 500,000 motors would be required. Figures were quoted to show that the railroads might save over $400,000,000 annually in handling charges if electrically operated handling machinery were placed at the disposal of transfer and freight men to help increase their daily output.

High wages, labor shortage and need of speeding up production were the three chief reasons

cited for speedy development in this field along lines of certain automobile manufacturers whose intensive production require continuous conveyor systems and other electrical helps.

Information to Public on Utilities Outlined in Committee Report.

The report of the committee on public information, of which John F. Gilchrist is chairman, outlined methods of disseminating information regarding utility companies to the public and suggested means of co-operation by the utility companies toward that end.

Plans for Bonus Systems Presented Without Comment by Committee.

Bonus systems for increasing employes' remunerations were presented without either indorsement or condemnation in the report of the accounting section's committee on bonus systems, of which Harry A. Snow is chairman.

Cognizance was taken of the fact that some methods of wage payments tending to increase loyalty and interest on the part of employes are undoubtedly needed in the electrical industry. It was recommended that further study of the wage question be made.

Of the 133 large central-station companies surveyed only 24 were found to have bonus systems in use. Reports were received by the committee of nine bonus systems having been tried and discarded. Wage plans of 20 concerns outside the electrical industry were also studied for additional data.

Co-operation of employer and employe was stated as essential to any such plan, the primary object being to increase efficiency and interest of the employe to the mutual benefit of himself and the concern. Unfair advantage taken by either side would militate against the success of any such plan.

Committee Seeks Lower Fire Insurance Rates for Electrical Industry.

Protection of its property in such a way that the public will not suffer because of impairment of service from damage by fire or other causes has resulted in the central-station industry reducing its fire losses to a minimum as compared with other industries, according to the report of the accounting section committee on insurance, of which E. J. Fowler is chairman.

As the result of this care, evidenced by the housing of central-station plants in modern fireproof construction, the ratio of fire losses to insurance paid was found to be only 6.6% for large city companies and 42% for small city and group utility companies. This is an average of 21.9% for all companies. The ratio of losses of the electrical industry was found to be less than 50% of the average.

Figures were presented to show that insurance amounting to $1,392,825,000 is carried by all electric light and power utilities in the United States at an annual premium cost of $4,080,977, and the annual losses for this industry aggregates $893,733.

It was noted that, except in isolated cases, the electrical industry pays the customary rates, and the report pointed out the desirability of the industry presenting a solid front in requesting reduced premiums which would be more in keeping with the actual fire hazard. It was argued out that as the smaller plants become obsolete, or are replaced for any reason with modern fireproof construction, the fire hazard will be decreased.

In an appendix to the report, prepared by J. G. Reese, it was asserted that, in very few instances is sufficient attention paid to the matter of insurance. It was charged that no well-organized company would purchase so carelessly any other commodity; that when spending the stockholders' money for something that will guarantee their investment, the utmost care should be used in the transaction.

Particular attention was called to the "co-insurance" clause to be found in practically all policies, limiting the liability of the insurance company to a specified portion of the actual cash value of the property. Central-station companies were urged to use care in insuring their property so that the actual cash value for which it is insured shall represent the real replacement value of the identical property destroyed, less a proper amount for depreciation.

Because of the present high cost of material, labor, etc., it was pointed out, the replacement value should be found to be in excess of the original cost, which only too often is used by companies as the basis for their insurance.

Customer Ownership in Light and Power Companies Exceeds $100,000,000.

Customer ownership of electric light and power utility securities exceeds a total of $100,000,000 and has been accomplished by the utilities at a much lower cost for new money that than would have been possible through investment brokers, stated the report of the committee on the sale of company securities to consumers and resident citizens, of which George R. Jones is chairman. In excess of half a million customers and resident citizens are becoming owners of the securities each year.

In commenting on this the report says the results of the plan have been universally good. The immediate results are gratifying and often surprising. The money seems to pour in, and, fundamentally, money is the object of the plan. Under conditions such as obtain at present, progressive central-station companies have seized upon the customer-ownership plan as a financial necessity.

Next to the financial aspect of the plan, the effects upon the employes, especially where the entire force is utilized in the selling campaign, is surprisingly beneficial. The employes learn about the company affairs and become supporters of the company because of the facts they learn.

Consciously or unconsciously the members of the public who own securities evince a fairer opinion regarding utility matters; complaints are fewer in number because of a better appreciation of some of the problems of the company, malicious and unscrupulous attacks are lessened, assistance is given in securing rights-of-way and co-operation is given in the matter of justified rate increases.

N. E. L. A. Convention Report

Technical Section Sessions

Economical Operation and Maintenance of Power Plants, Standardization of Equipment and of Service Voltages, and Operation of Interconnected Steam and Water-Power Plants Feature the Two Sessions of the Section

The various committees of the technical and hydroelectric section should be so organized that productive work will be accomplished and reported on continuously, stated I. E. Moultrop, chairman of the technical and hydroelectric section in opening the first of the two sessions of the section. New developments, if worth while, ought to be given out as soon as the committee is prepared to report favorably on them and not withheld to fatten a report at the convention. He did not believe that technical committees would be required for each of the new geographic divisions, but that the national section committees would be fully able to supply the technical information required.

The bulletin of the association should be used for the spreading of information collected by the technical section in order to add to the value of the bulletin itself and to make the information more generally useful. The various companies were called upon to advise the section and the committees of the problems requiring solution.

Mr. Moultrop gave a short review of the work of the various committees and passed favorable comments on the outstanding features of accomplishments.

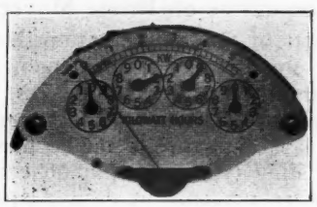
President R. H. Ballard addressed the first session of the technical and hydroelectric section and commended the section highly for its work and for the character and value of its report.

The report of the nominating committee was adopted and the following officers were elected: I. E. Moultrop, chairman; N. A. Carle, A. L. Lawton and H. A. Barre, vice-chairmen; R. F. Schuchardt, O. B. Coldwell, Philip Torchio, H. B. Liversinge and S. J. Lisberger, committee members at large.

Training of Meter Men Outlined in Report of Committee on Meters.

Section 10 of the code for electricity meters was given in full in the report of the committee on meters, of which F. V. Magalhaes is chairman. This section pertains exclusively to demand meters and is made up of five distinct parts, the last two of which cover system tests and maintenance methods and were completed during the past year. Other matters reported on were, in the main, items held over for further study from the last convention.

Special educational training of meter testers was considered to be of importance, and a special training course was outlined. This special course includes a study of elementary mathematics, practical electricity and the principles of electricity meters. The following books were enumerated as satisfactory references for both the instructor and the student: "Electric Meterman's Handbook"; "Code for Electricity Meters"; National Electric Light Association course in "Practical Electricity"; Fort Wayne Correspondence School course; Jansky, Cyril M., "Electricity Meters"; Soloman, H. G., "Electricity Meters"; Napier Tercentenary Exhibition; Cox, William, "The Mannheim and Duplex Slide Rules"; Gerhardi, "Electricity Meters"; Laws, Electrical Measurements; Karepetoff, "Electric Circuits"; Karepetoff, "Magnetic Circuits"; meter committee report for 1909; various correspondence courses standard text books, and various reports of the meter committee. As a specific item in education on meters and metering problems, it was announced that a lecture suitable for general presentation had been completed. This lecture will be supplemented with lantern slides to aid in making its applications specific and interesting.



Demand Meter Register for New or Old Watt-Hour Meters.

The results of tests on instrument transformers indicated that such transformers were accurate to satisfaction for the types and makes covered. The average of 488 tests on current transformers shows a light-load accuracy of 99.99% and a full-load accuracy of 99.46%. The average accuracy of the potential transformers is not quite as good. The maximum inaccuracy reported was slightly over 2%. Variation in transformer accuracy with age was considered of slight importance. The average change in accuracy shown by the total of all transformer tests submitted by the several companies was 0.115% at light load and 0.118% at full load. This is so small a change as to be negligible and leads to the belief that there really was no permanent change in the transformers during the period between tests.

It was brought out that most of the member companies in the West do not fuse potential transformers for metering purposes except where they are located in generating plants or substations. Most western operating companies prefer meeting the hazard of not protecting potential transformers to the difficulty of adjusting bills rendered incorrectly due to non-registration of one element of a polyphase meter.

Standardization of disc constants and of transformer terminals was reported to be of consider-

able importance. Standardization of disc constants would greatly simplify the testing formulas and calculations used by testers, thus lowering the costs of tests and eliminating much of the possibility of error. This is particularly important because of the difficulty of securing competent testers. Expense would be saved in making changes of transformers were their terminals standardized.

New developments in meters described in the report include types of demand meters, volt-ampere-hour meters, watthour meters, graphic meters and a number of special-service instruments.

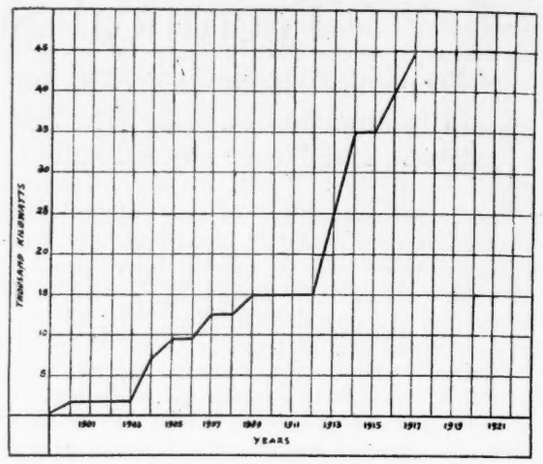
In discussing the report, R. C. Lanphier expressed approval of the proposed meeting of meter men and asked to have meetings held at various places for the good of the meter manufacturer as well as for the good of the meter men. J. M. Morris recommended meetings of a local character to consider meeting problems peculiar to a given territory. W. K. Vanderpoel discussed the present tendency towards the use of various types of meter protective devices.

Economies of Operation Are Emphasized by Committee on Prime Movers.

The effects of the fuel situation, both present and past, were prominently evident in the report of the committee on prime-movers, of which N. A. Carle is chairman. The report was devoted in a large measure to the economic utilization of existing types of equipment and it was shown that refinements in design and improvements intended to facilitate operation or increase economy were the objects aimed at in the manufacture of apparatus during the past year.

The sizes in single-barrel turbine units during the past year were limited to 30,000 kw., 1800 r.p.m. for 60-cycle service and to 35,000 kw., 1500 r.p.m. for 25-cycle service. The balancing of high-speed turbines is being given special attention, and a considerable amount of research work is being done to guide the designer in the allowances to be made for vibration and strain from unbalanced members.

The maintenance of high vacuum and the limiting characteristics of condensing equipment is being given careful attention by plant operators. A paper on this subject prepared by A. D. Bailey



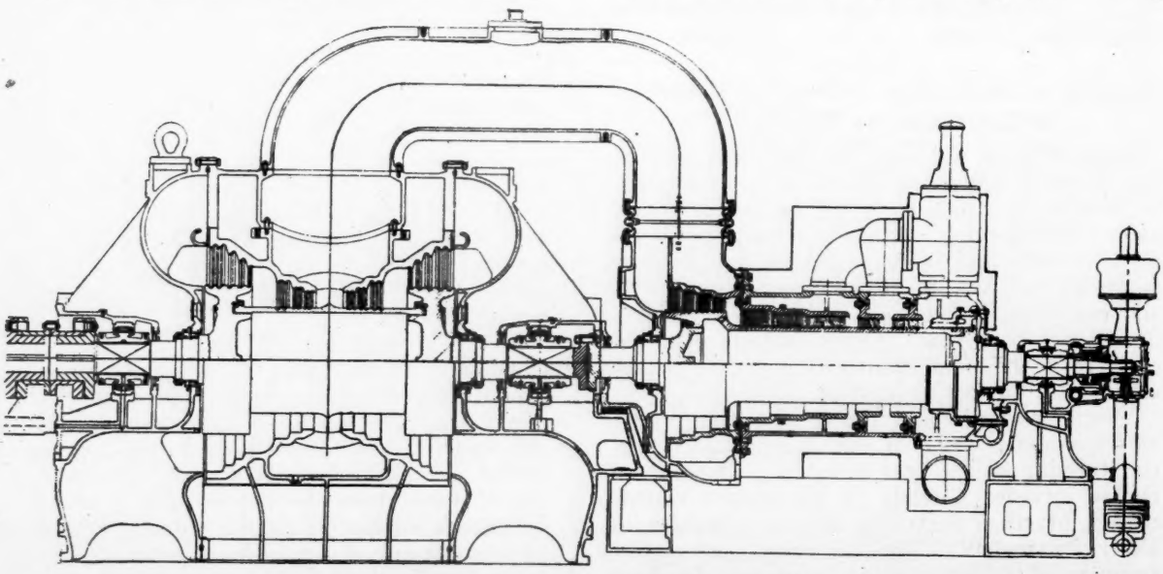
Curve Showing History of Growth in Size of Turbine Units.

of the Commonwealth Edison Co., Chicago, was presented.

The tendency towards large sizes in boilers and superheaters prevailed through the past year. Units of 1000 to 1500 hp. are common in modern central-station practice. Manufacturers' statements indicate a tendency towards larger sizes or higher rated capacities at existing pressures, and at least one manufacturer announced a willingness to produce boilers with heating surface areas up to 60,000 sq. ft. A section of a proposed boiler of this size is shown in the accompanying illustration.

The tendency in economizer design has been towards the use of steel tubes. Stokers have been laid out, together with their setting, with the idea of allowing the use of oil fuels where such fuel is economical.

Considerable attention was given to the burning of low-grade fuels and pulverized coal. With lignite and sub-bituminous coals, hand-fired grates seldom give boiler ratings over 100% and efficiencies are usually below 60%. Using



Cross Section of a Modern 30,000-kw. Turbine.

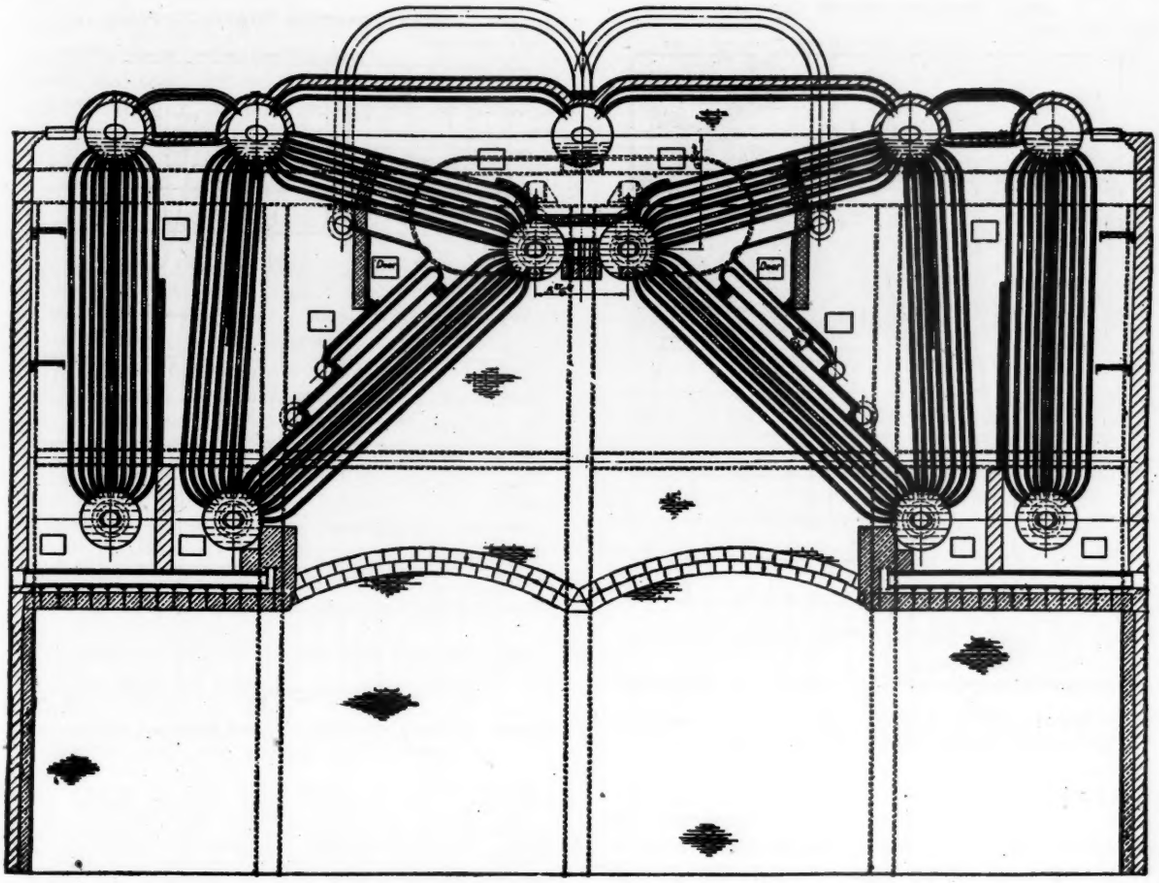


Diagram of a Proposed Boiler to Have 60,000 Sq. Ft. of Heating Surface.

mechanical stokers, outputs from 200 to 300% are sometimes possible with efficiencies ranging up to 70%. Combustion rates as high as 35 lbs. per hr. per sq. ft. of chain grate area, and with underfeed stokers over 1000 lbs. per hr. per retort have been reported. Special adaptations of stokers, furnaces and draft conditions are in general called for by lignite and sub-bituminous coals, especially on account of their tendency to disintegration and their high moisture content.

There has been a rapidly growing interest in the development of pulverized-fuel equipment and a large number of installations of this character have been placed in operation. One of the questions which has been passed over too lightly by both manufacturers and users of this equipment is that of the ultimate disposal of the fine ashes which now pass out of the stack. If the use of pulverized fuel is extended, municipalities will undoubtedly pass ordinances to eliminate the ash nuisance unless precautions are taken to forestall such action.

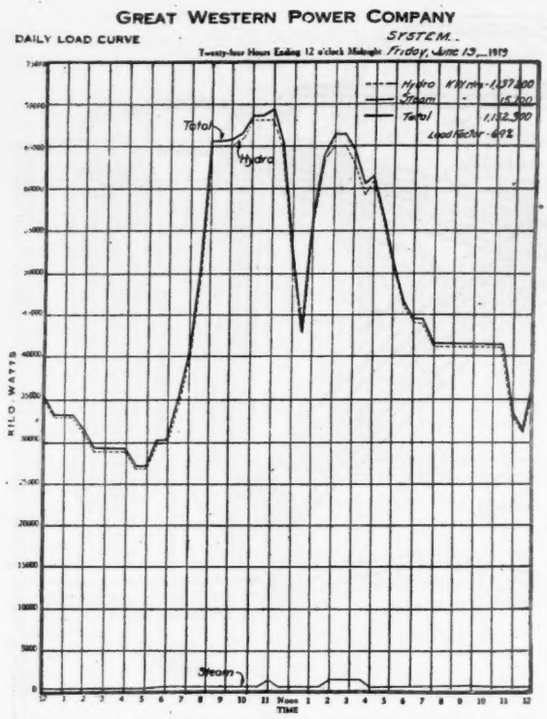
The past year developed an increasing use and interest in indicating and recording instruments. The wider use of these devices has been justified by the savings realized since their introduction. Among the more important points brought out by the committee's investigation are the need of a reliable and reasonably cheap pyrometer, the adoption by some companies of meters on boiler blow-down lines and the substitution of self-starting synchronous motors in place of clock mechanisms for instrument drive.

In connection with electrical signal systems, it is believed that too little attention is paid to design features. On account of the importance of these systems just as much attention should be given to their arrangement and power supply as is given to switch operating and excitation systems.

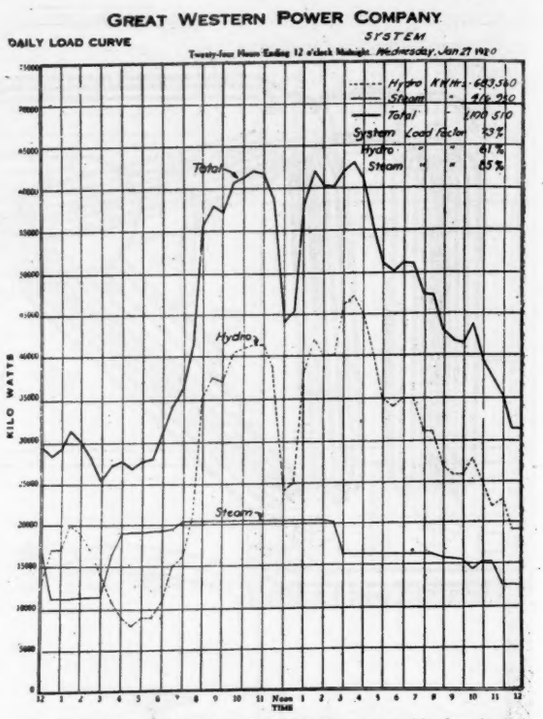
Hydroelectric Equipment.

Much attention was given to the development and use of hydroelectric units. The scarcity and cost of fuel continues to make the development of water power a vital issue in the expansion of the industry. The large number of hydroelectric units installed throughout the United States, with high overall efficiency and almost perfect continuity factor, and the development of a new type of high-speed runners are the outstanding features for the year. Automatic hydroelectric plants are receiving favorable consideration and there is a tendency to confine the power station building to the housing of only generating and control equipment. Where climatic conditions are favorable there is an even more radical tendency to have the generating equipment outdoors, housing only the control apparatus. Manufacturers' statements indicate a trend toward larger units and the consolidation of small water-power projects into single stations of large capacity.

The combined operation of hydroelectric and steam plants presents many operating problems which should be worked out for the best interests of all parties, and to secure minimum overall cost. Unnecessary steam generation should be eliminated as far as possible to secure the maximum hydraulic output consistent with minimum steam cost, including maintenance. In-



Curves Showing Division of Load Between Hydroelectric and Steam Plants During High-Flow Periods.



Curves Showing Division of Load Between Hydroelectric and Steam Plants During Low-Flow Periods.

creased costs of construction and fuel and increase in loads make it particularly important to secure the maximum useful work out of every pound of water that can be used for power generation. Two interesting sets of curves shown in the accompanying illustrations give a definite idea of the way in which steam plants are utilized in actual practice to make the most of the available water power in serving the load that can be obtained.

Consideration was given to many points relative to matters of operation and maintenance of prime movers and their auxiliary equipment. The evident dissatisfaction experienced in the operation of small gear-driven turbine units was attributed to faulty lubrication or unsatisfactory installation. However, in some cases the trouble was considered to be due to faulty balancing of parts. Defective methods of connecting steam lines to large units were described and it was pointed out that in all cases the steam lines should be so anchored that expansion is away from and not towards the turbine. Evaporators for the purification of feed water were given considerable attention and items in favor of and against their use were presented.

The printed report of the committee contained a mass of information gathered from operating companies, manufacturers and individuals. Many illustrations and charts and much tabulated data were presented.

Oil and Water-Power Units Considered in Discussion of Report.

R. J. S. Wood stated that, in his opinion, the subject of reliability of turbine construction had not been given the attention which it deserved. Further discussion developed the fact that this point had been somewhat neglected, but would be taken up promptly and thoroughly.

E. C. Hutchinson discussed the water-wheel situation and stated that larger units were gradually coming into favor. N. A. Carle, E. E. Gilbert, E. H. Sniffen, and F. L. Webster discussed general and special features of the report.

In connection with the report, a paper prepared by D. S. Jacobus and N. E. Lewis pertaining to atomizing oil-burners was read by C. R. Weymouth. The discussion brought out that new fuel-oil contracts were being refused on the Pacific Coast and that a serious shortage was expected. H. D. Savage, of the Combustion Engineering Corp., stated that pulverized coal could be used in oil furnaces and would relieve the oil-shortage situation.

A committee report on certain phases of water-power prime movers brought out considerable discussion in which it was stated that too much time was given to steam and not enough to water-power machines. It was decided to pay more attention to water-power prime movers and Markham Chever was proposed as chairman of a new committee to cover this subject.

Maintenance Practices Summarized by the Overhead Systems Committee.

Field performance of suspension-type insulators was given prominent attention in the report of the overhead systems committee, of which W. K. Vanderpoel is chairman. The investigation of this subject, conducted through the use and analysis of a comprehensive questionnaire, revealed a decided lack of uniformity of practice under many conditions. It was brought out that, in 66-kv. steel-tower line construction, one important line in the East was built with eight-unit strings in suspension and nine-unit strings in tension, one line in the Northeast was built with six and seven-unit strings and one line in the

Central West was built with six units in both suspension and tension positions. In 66-kv., wood-pole construction a tendency towards the use of four and five-unit strings for suspension and tension was indicated, and special comment was made on the fact that these standards seemed to prevail in all sections of the country.

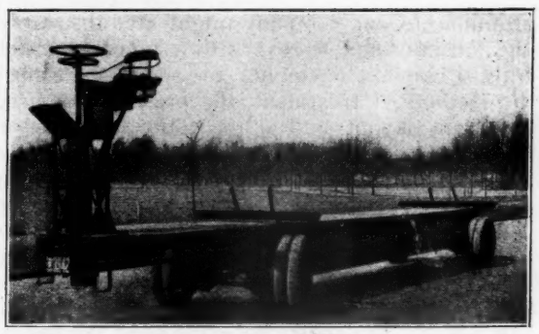
Insulator Practice.

Failure and deterioration of insulators were attributed to porosity, initial defects in manufacture and troubles resulting from different expansion coefficients of porcelain, cement and hardware. In the comments on pin-type insulators, it was brought out that uncemented insulators were seldom subject to cracking, regardless of exposure. Thermal fatigue was given as the apparent major factor in suspension insulator deterioration, and it was suggested that some means should be devised for producing an ageing effect in a short period of time. If such an effect could be produced, the more costly service trials could be eliminated in the majority of cases.

Methods of high-voltage line repair work were described as used on the property of the Georgia Railway & Power Co. Special tools having well seasoned, varnished white-oak handles are employed, and great care is used in the maintenance of this equipment, all tools being stored in a drying room when not in service. This company changes suspension, strain and pin insulators, removes crossarms, replaces poles, reinforces lines and does a considerable variety of other work on live lines operating at pressures up to 110,000 volts.

The practice in installation and use of ground wires was shown to be quite irregular, but it was recommended that grounds should be made at every pole in dry ground and at intervals of 500 or 600 ft. in wet or marshy ground. Galvanized steel strand is commonly used for the ground wire, although a number of companies use copper-clad steel strand. Copper-clad wire is used where atmospheric conditions are not favorable to galvanized wire or where high conductivity is desired.

Hole-Drilling and Pole-Setting Truck.



Pole-Hauling Truck.

Overhead Cable Lines.

Installations of overhead cable lines of 13,000 and 26,000 volts were illustrated and described, and it was suggested that this type of construction might be adopted to solve many of the difficult transmission problems. Particular attention was called to the fact that this type of pole-line construction requires special guying to care for the heavy strains involved.

There are several kinds of aerial cable in service, some of it being the ordinary type of paper-insulated, lead-covered subway cable installed on a messenger. Other installations have used subway cable with a winding of steel tape and jute for mechanical and weathering protection. The lead covering, with the steel tape added, makes a very heavy cable for suspension on a messenger. Another type of cable has the lead covering replaced by a jacket of reinforced rubber. On this rubber covering is a winding of soft steel tape with a layer of jute over the steel tape. This give a perfectly waterproof cable which, in the larger sizes, weighs considerably less than the lead-covered cable. With this cable, it is entirely feasible to make splices to lead-covered cables and, through potheads, to open-wire lines.

Two general methods of installing overhead cables came to the committee's attention. The more common method is to bolt the messenger to the pole with a 5/8-in. through-bolt and a three-bolt messenger-clamp. The cable is then suspended from the messenger by cable rings. This type of construction follows very closely the telephone companies' method of supporting their aerial cable. When more than one cable is to be placed on a pole line, some companies install them one above the other on the same side of the pole.

Treatment of Poles and Crossarms.

In analyzing the problems of preservative treatment it was brought out that both poles and crossarms should be well seasoned prior to treatment and that crossarms should always be seasoned whether treated or not. The process and preservative to be used by any company should be determined upon only after a careful analysis of the local plant conditions. The treatment

profitable to one company might give discouraging and unprofitable results to a company differently situated. The climate, the species of timber, the method of treatment, the preservative used, the plant layout and other controlling factors necessitate diversified practices in order to meet the various requirements found throughout the country. Painting crossarms or painting poles at the ground line adds little to their useful life, although a pressure treatment of crossarms may do considerable good. Great care should be exercised in handling a treated pole in order to prevent the destruction or rupture of the treated exterior surface. The breaking of the treated surface, either by rough handling in the yard, in transportation or in setting, defeats the purpose of treating by opening vulnerable spots for the entrance of decay.

Automobile equipment is becoming an important factor in line maintenance and vehicles suitable for emergency calls, service installation, regular construction and heavy construction work were described and illustrated. Rigs suitable for digging holes and setting poles are available, and trailers may be purchased for a great variety of special services.

In discussing tests made on suspension insulators, J. A. Koontz stated that insulators subjected to temperature changes deteriorated as rapidly on the ground as they did when in service, and also that most failures were noted on the units receiving the lowest voltage duty. He said that, in the future, tests would be made on groups of 500 insulators, one group being subjected to even temperature and one group to rapidly changing temperatures.

Most failures of insulators occur on the mountain lines of the Southern California Edison Co., according to H. A. Barre. He stated that, in his opinion, climatic conditions have much to do with the actual performance of insulators.

C. F. Denham exhibited charts showing the average age of insulators on the Pacific coast to be 9 years and the maximum life to be 12 years. He stated that insulator depreciation was found to be high when operating on a high temperature cycle. Features of the report were discussed by J. P. Jollyman.

Cable and Duct-Lines Discussed by Committee on Underground Systems.

Three-conductor cable should be used in preference to single-conductor cables for transmission of loads less than 10,000 kw., and for potentials of 25,000 volts or less, according to the report of the committee on underground systems, of which F. E. Ricketts is chairman. The limiting capacity of various types of cables was given much attention and suggestions were made for temperature surveys throughout the length of duct lines. It was pointed out that varying kinds of earth might, on account of having different rates of thermal conductivity, be the governing factors in determining the ultimate capacity of a given cable, and it was suggested that the earth might be replaced in certain cases to make the best use of a line.

It was the opinion of the committee that 3.5-in. ducts were the largest size required because of the fact that it is not desirable to install cables over 3 ins. in diameter. Manhole design was treated in the light of past practice and suggestions were offered looking towards the use of large-size cables. Various shaped holes were discussed and a special setting of a square hole, with the ducts entering at the corners, was recommended as having several advantages. Attention was called to the advisability of separating the sections of a duct line carrying high and low-tension cables, particularly in places where there is a large amount of cable work in the street.

In the location of cable faults a variety of apparatus is used, both in the measurement of the fault and in making the fault measurable in case it has been burned clear. The proper uses of testing or burning sets up to 1000 kv-a. in capacity were described, sets of this size being suitable for work on lines operating up to 27,000 volts. Large reactances, either inherent or external, should be used with such sets to limit current surges on initial breakdowns. A tabulation of data on a total of 3814 miles of 6600 to 25,000-volt cable showed a total of 311 failures, of which 107 were in joints. This amounts to an average of 8.2 failures per 100 mi., although individual instances of failure ran up to 88 per 100 mi. on a 23,000-volt system and to 58.8 per 100 mi. on a 22,000-volt system. On one system of 1260 mi., operating at 25,000 volts, no failures were reported at all and in most cases the failures at or below 9000 volts were practically negligible in number.

As an appendix to its report, the committee submitted a general specification for paper-insulated, lead-covered underground cable and recommended that all companies purchase under this specification when possible.

Many Developments Described by the Committee on Electrical Apparatus.

The establishment of a single-voltage standard for services was one of the most important recommendations made by the electrical apparatus committee, of which R. F. Schuchardt is chairman. The report pointed out the fact that such a standard would greatly reduce the assortment of appliances required to be manufactured and carried in stock, and so would save a vast amount of useless expenditure.

Attention was called to the importance of having industrial services controlled through oil circuit-breakers and of having proper types and standards in these switches. One fault particularly enumerated pertained to a style of design wherein the mechanical forces, due to heavy currents, tended to open the switch contacts.

Careful consideration was given to the hazards of fire in oil and air-cooled transformers, with the general conclusion that there are no unusual fire hazards in connection with the use of oil-filled equipment. While fires have been known to occur in oil-insulated transformers, any assumption that the use of oil in modern transformers creates a hazard is not correct, since explosions have occurred inside of such transformers with no further damage than the breaking of the cover or the distortion of the tank.

The liability of explosions in good present-day construction is lessened by the fact that the atmosphere above the oil is maintained at ground

potential and free from any static stress. This is accomplished by having the metal supporting the leads or bushing extend down below the oil level so that any over-voltage, creating a possible discharge, must occur under the oil and consequently be smothered instead of, as in the past, occurring in the gaseous atmosphere above the oil.

Many new designs and appliances, intended to increase the utility or capacity of transformers in service, were described in the report. One of these devices, known as a network protector and shown in the accompanying illustration, has been on the market as a separate unit for some time, but only recently has been made an integral part

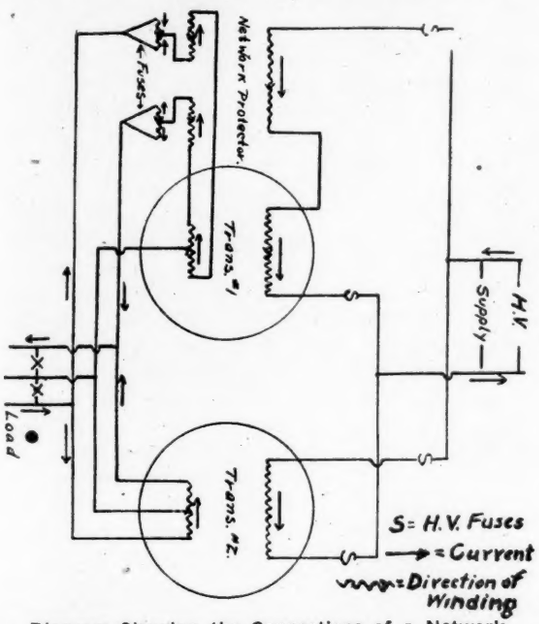


Diagram Showing the Connections of a Network Protector.

of the transformer itself. This device is intended to make possible the use of transformers in multiple, and so obtain better efficiencies and load-factors on distribution systems.

Types and Applications of Automatic Substations.

Automatic substations were given much attention and various types and applications were described in detail. The first full automatic substation for supplying current to a three-wire network is now being manufactured for a large central-station company. This equipment consists of a 500-kw. synchronous motor-generator set. The generator is flat compound for 250-volt operation and is equipped with balance-coils for three-wire operation. In this equipment, no effort is made to parallel voltages before connecting the d-c. end to the line. The field rheostat is set for the proper running voltage and left at that point, the compound winding taking care of the required regulation under changing load conditions.

This set is to be installed in a large building sufficiently far away from the nearest manually operated substation to have required a large amount of feeder copper to maintain voltage conditions that would be acceptable to the customer. The local network is to be tapped with cables of sufficient capacity to carry the entire load of the building in an emergency, but under these conditions the regulation will be very poor. A set of automatic contactor-switches will be installed in these taps to insert resistance if the outflow of current from the automatic substation reaches an amount which would jeopardize the service to the building.

The automatic substation above described is expected to give better service at lower annual cost than either a manually operated station or a set of feeders from the nearest existing substation. The estimated annual costs of the three types of service are $5100 for the automatic station, $7050 for the feeder system, and $8100 for the manual station.

The outdoor substation was given consideration and instances were cited where 12,000-kv-a., 27,600-volt, and 10,000-kv-a., 110,000-volt transformers had been ordered for such service. In the case of the a-c. substation supplying distribution systems operating at from 2300 to 7500 volts, it is possible not only to make the substation entirely automatic, but it can be of the outdoor type, or at least of the semi-outdoor type. In any event, there are few good reasons for not placing the transformers, their oil circuit-breakers and the incoming transmission-feeder oil circuit-breakers outdoors. The high economies of transmission and distribution copper made possible by the establishment of the automatic, a-c. distribution substation will result in the use of smaller substation capacities than have been customary where attendants are employed. This means a small number of transformer units, incoming feeders, etc., and in general is conducive to use of the simplest kind of substation. Where the price of the outdoor low-voltage equipment exceeds the cost of the indoor regulator, low-tension switch equipment and building, the least expensive arrangement would work out with the low-voltage equipment located in a well ventilated, inexpensive fireproof housing.

Motor rules, pertaining particularly to the starting characteristics of motors suitable for connection to central-station mains, were given in detail. These rules prohibit the use of 115-volt, d-c. motors larger than 0.75 hp., and limit the starting currents for 230-volt motors of 3 hp. or less to 12 amperes per hp., and for motors of over 3 hp. to 9 amperes per hp. Motors for 3-phase, 220-volt, a-c. service are limited in starting current to 20 amperes per phase per hp. for motors of 1 hp. or less and to 6 amperes for motors larger than 30 hp. Appropriate values are set for other sizes of motors and for the various voltages up to 2200.

In a paper on substations, presented subsequent to the report of the committee, H. Carl Albrech recommended the installation of some permanent form of fire-fighting equipment for generators. L. L. Elden presented a report on standardization of oil circuit-breakers, which was discussed by A. W. Copley, who suggested that operating men get together in their demands for improvement.

In discussing a paper on transformer oils, M. O. Try declared that oils for transformer use could probably not be standardized in the near future.

N. E. L. A. Convention Report

Commercial Section Sessions

Plug Standardization and Wire Tests are Considered by Wiring Committee—Highway, Residential and Outdoor Lighting Discussed by Sales Bureau — Nation-Wide Power Sales Campaign Is Planned for 1924

The three sessions of the commercial section held Wednesday, Thursday and Friday were filled with well-prepared papers and discussion of the papers, the principal interest centering in the reports on electric range sales, lighting in the home and on highways and of the various industrial applications of electrical energy.

At the opening session President Ballard addressed the section briefly on central-station problems. He gave the commercial man a high place in the industry, ranking him equal to the technical engineer, and emphasized his belief in the good results obtained from co-operation in all branches of the industry.

In connection with the sessions there was a well-equipped demonstration hall, which was visited by the commercial section delegates in a body, and an examination made of the exhibits showing the latest standards in industrial lighting effects, the new effects being explained to the delegates by S. E. Jones and Ward Harrison.

The following officers were elected for the ensuing year: M. S. Seelman, Brooklyn, chairman; R. H. Tillman, Baltimore, first vice-chairman; R. S. Hale, Boston, second vice-chairman; C. E. Michel, St. Louis, third vice-chairman; Lee S. Newbert, San Francisco; Clarence L. Law, New York City; C. N. Standard, Denver; Oliver R. Hogue, Chicago; George A. Hughes, Chicago, and J. J. Gibson, Pittsburgh, were named as members of the executive committee.

Importance of Plug Standardization and Wire Tests Discussed.

The standardization of appliance plugs and housings was taken up at the commencement of the report of the committee on wiring, submitted by R. S. Hale, chairman, the report stating that the importance of standardization of this item is being increasingly recognized, but that comparatively little progress had been made. One reason is the genuine doubt existing as to the best standard, since both flat prongs and round prongs have distinct advantages and disadvantages and, further, there is still a question as to whether there should be different type, one heavy and rugged for such articles as flatirons, and another type, non-interchangeable with the first, for light articles like heating pads, percolators, etc. The second reason for the delay is the disinclination of each manufacturer to adopt a standard other than his own.

Practically all of the manufacturers recognize the importance of standardization and are working toward that end. The existence of certain interchangeable plugs offers a stepping stone or waiting place before standardization is attained.

The tests of wiring at different ages are being continued. The laboratory work is being done at the Electrical Testing Laboratories, which now has prepared reports on 50 or 60 different types of wiring, such as ordinary open wire, wood molding, conduit, etc., under various conditions, such as ordinary temperature, kept hot, kept moist, etc. Three tests are made, the initial one, one at the end of six months, and one at 18 months. No further tests will be made until at the end of five years, and the wires which are still in good condition at that time will be left for another five years.

In studying the question of standardization, the committee also took up the question of the portable cord. In 1919 it was reported that it would be undesirable to standardize portable cords in regard to dimensions, etc., but that the only standardization which would be useful would be in the way of a minimum of quality, this minimum, however, to be based on experience. A series of tests will be started this year and it has been so arranged to control the tests that they will give the real commercial value of the cords. Manufacturers will be asked to submit sample cords, confining themselves first to the cords suitable for use in the domestic flatiron. Two different sets of people, one composed of the managers of central-station appliance departments, and the other composed of wiring contractors, etc., will rate the different cords submitted. Each individual will rate the cords and the average of all the reports will be computed, the theory being that the cord which on the average is rated highest is probably the best cord for commercial use.

It has been arranged to have the Electrical Testing Laboratories put the portable cords through a series of mechanical and physical tests, such as rubbing, bending, etc., the idea being that if the laboratory tests put the cords in the same order of merit as the judgment of the commercial men then the tests will serve as a check. If the laboratory tests do not check up with the judgment of the commercial men the work will be continued until an approximate agreement between the two is reached.

Deflation Period Seen Impending in Sale of Electrical Appliances.

That the tremendous inflation of last year in the merchandising situation is about due to be succeeded by a period of deflation was noted in the report of the merchandise sales bureau, of which E. A. Edkins is chairman.

Whether or not 1920 will be the largest merchandising year in the history of the industry will depend to a very large extent on whether this period of deflation sets in gradually or suddenly. A survey recently made indicates that

the volume of sales in merchandise and supplies in 1920 will exceed $2,000,000,000. At the present time there are approximately 2,650,000 fractional horsepower motors on order, which is a definite index to the enormous demand for motor labor-saving devices which the manufacturers expect to sell during 1920.

Electrical jobbers and dealers were confronted with a serious shortage of merchandise last fall. During the first three months of this year courageous and far-sighted buying has been the rule rather than the exception. It seems doubtful that any decided drop in prices or curtailment of demand on the part of the buying public will come so suddenly as to have any serious effect within the present year. The inevitable decline, however, cannot be far distant, and future delivery orders for 1921 should be placed with conservatism and on a shorter time basis.

William E. Robertson approved the report of the bureau, as did P. L. Thompson, who said the plan of the electrical jobbers working in harmony with the dealers and manufacturers was a step in the right direction. A. C. McMicken said the central-station companies needed the co-operation of contractor-dealers and that the appliance business must be maintained on a profitable basis to attract new men and money. H. W. Clark urged the interconnection of the interests of the power companies, jobbers and contractor-dealers in order to stabilize the industry, and wanted to see estimates of business made in advance of stock and power demands in order to avert violent fluctuations in those phases of the industry.

Electrical Appliances Are Emerging from Novelty and Luxury Class.

While electrical appliances are becoming fairly well established as daily household necessities, people generally still have much to learn regarding the construction and durability of electrical appliances, stated the report of the electrical merchandise division of the merchandise sales bureau, of which F. D. Pembleton is chairman.

Because of this condition it is obvious that a large number of poorly constructed electric appliances placed on the market would have an unfavorable effect upon the sale of electric appliances generally. It is urged that merchandise managers adopt and maintain a policy of selling only appliances of a high standard of quality.

The scarcity of material and labor, the resultant scarcity and high prices of electrical appliances and the great demand for certain kinds of electrical goods have produced new conditions surrounding the purchase of electric appliances. There is little indication that the supply of the popular types of appliances will equal the demand that will exist for the next two or three years. Therefore the buyer of appliances will be confronted with the necessity of planning his sales well in advance in order that he may purchase his goods sufficiently far ahead to assure himself of a sufficient stock.

Some manufacturers at the present time are taking advance orders for an entire year's supply with specified shipping dates. In some cases this is the only way that a buyer can be assured of receiving the required amount of goods. Such a plan enables the manufacturer to secure his raw material, and arrange his work schedules so that he can operate his factory on the most economical basis, and because of these advantages some manufacturers offer an additional discount to buyers who will place their orders in advance for an entire year.

Should Place Central-Station Appliance Sales on Self-Supporting Basis.

The merchandising branch of central-station companies should be put on a self-supporting foundation and greater attention given this rapidly growing and vitally important feature of the business of the progressive company, stated the report of the electric shop management division of the merchandise sales bureau, presented by C. E. Greenwood, chairman.

The division recognizes divided opinion on whether a central-station company should retail appliances. In certain sections of the country appliance selling has been given over exclusively to the jobbers and dealers. Generally speaking, the jobber performs his function of warehousing and does not retail.

Electrical apparatus can be sold only to users of electricity, and in the beginning the central-station company is the only establishment which knows just who these users may be. The central-station company starts, therefore, with a list of prospects containing every possible purchaser of the article it is trying to market. The prestige of the central-station company is of tremendous importance in the sale of electrical wares. The public in general is imbued with the idea that the electric service company is more able to furnish them with correct merchandise at the proper value than any other establishment in the field.

Formation of National Bureau Recommended by the Testing Division.

Organization of a national testing bureau was urged in the report of the standardization and testing division of the merchandise sales bureau, of which Oliver R. Hogue is chairman.

It was suggested that the bureau be operated along lines that would furnish to its clients a thorough testing service, conducted along standardized lines and employing standard specifications to be approved by a committee consisting of representatives of central-station companies, jobbers, contractor-dealers, manufacturers and the N. E. L. A. It was stated that it is believed that the bureau would eventually become a self-supporting proposition.

Electric Range Triples Revenue Service from Average Customers.

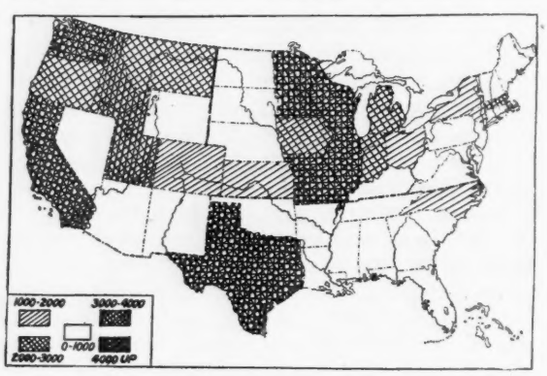
The present day conditions in the electric range industry as it affects central-station companies was outlined in the report of the electric range division of the merchandise sales bureau, of which J. Paul Clayton is chairman. The report, which was presented at a general session, dealt briefly with a presentation of conditions to central-station companies which have been considering the development of the electric

cooking business but who have not yet entered the field.

The tremendous increase in the cost of labor and material, due to war conditions, has served to cause a new level of costs, affecting both the central-station's investment to serve the electric range, and also the manufacturing of the range itself. The question which confronts many central-station companies now considering the introduction of electric cooking is whether, under the present level of these costs, they are justified in establishing a rate suitable for electric cooking and in incurring the necessary investment to take care of the business.

The average lighting customer pays somewhere between $18 and $24 a year for lighting service, while the average electric range customer pays from $42 to $50 a year for cooking service. In other words, when the average existing electric lighting customer becomes a cooking customer, the gross income from the customer is trebled, without increase of investment proportional to the increased income. In many cases the additional investment is not as great as the original investment per customer for lighting service. In the past two years a very large number of electric ranges have been sold, so that at the present time there are about 75,000 ranges in use in the United States, as compared with only about 10,000 in 1915. The 75,000 ranges now in use does not represent the normal development that would have taken place in the industry had war conditions not intervened, as many central-station companies were forced temporarily to curtail the selling of ranges during the war, due to the fact that war conditions demanded their entire plant capacity.

In order to show the distribution of the electric ranges in use at the present time, a map has been prepared, which is reproduced herewith, showing the relative density of electric ranges in use by states. This map shows that the electric range has been generally adopted throughout the



Relative Density of Electric Ranges Used by States.

United States and that its use is not confined to any one locality.

Central-station electric service is available today in approximately 12,689 communities. Electric cooking rates are now offered in nearly 5000 communities, which shows how widely spread is the general field for electric cooking.

In discussing the report George A. Hughes told of manufacturing conditions and said his company would build 60,000 electric ranges of an average of 5-kw. capacity each during this year. L. A. Lewis gave an analysis of electric range and water-heater business in Spokane and suburban towns, and reported that his company had decided to sell electric ranges only in connection with electric water heaters.

Economic Division Plans Power Drive Sales Campaign in 1924.

The report of the division on the economics of the use of central-station electric power of the power sales bureau, of which John W. Meyer is chairman, included an exhaustive study

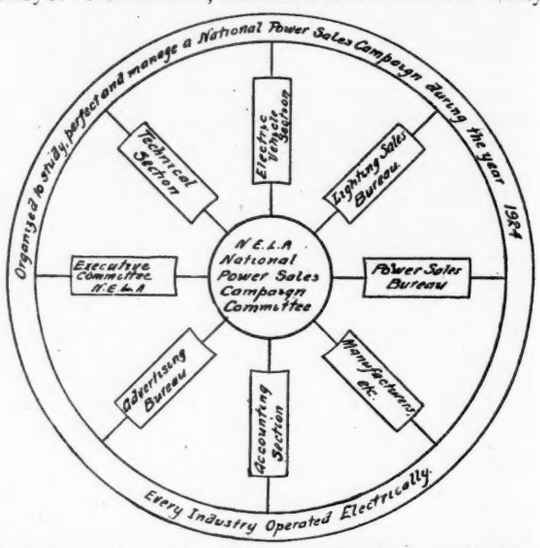

Organized to study, perfect and manage a National Power Sales Campaign during the year 1924
Every Industry Operated Electrically
N.E.L.A. National Power Sales Campaign Committee
Executive Committee N.E.L.A.
Technical Section
Electric Vehicle Section
Lighting Sales Bureau
Power Sales Bureau
Manufacturers etc.
Accounting Section
Advertising Bureau

Chart Showing How Directing Functions of National Electric Power Sales Drive Will Be Arranged.

of the economic problems that have confronted the central-station industry in the past four years.

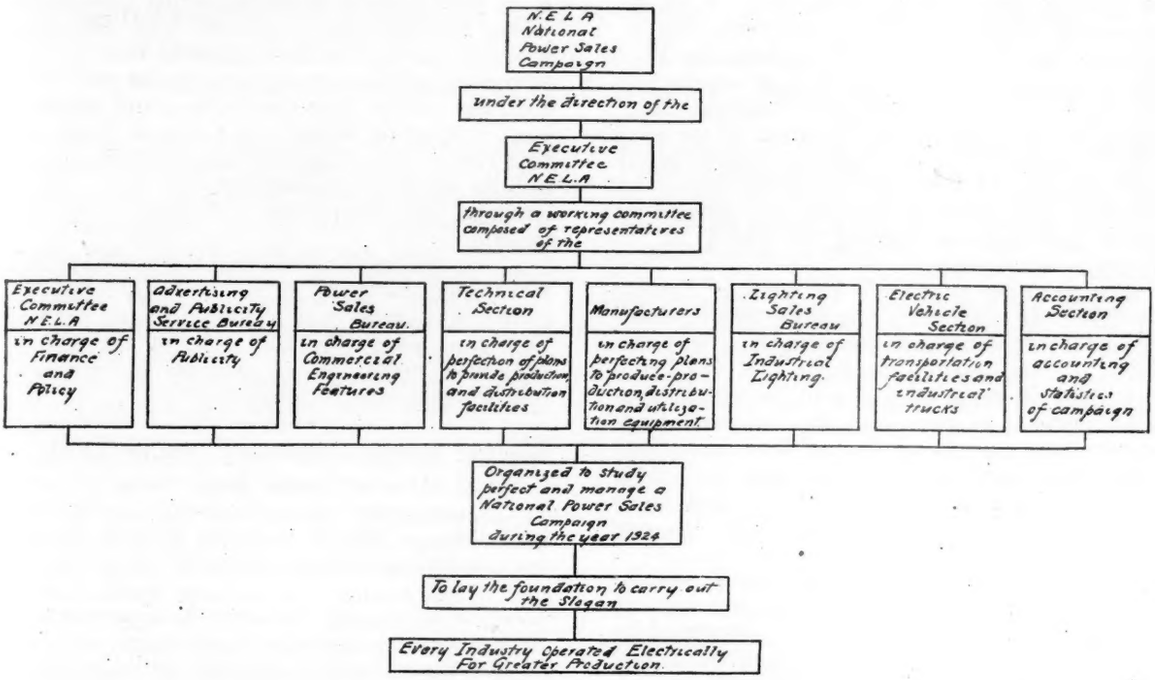
The tremendous amount of work yet to be performed to accumulate power sales data suggests the need of a central bureau, wherein all requests for data may be formulated and issued to members, the replies to be tabulated, recorded, assimilated, interpreted and distributed.

The establishment of standard methods and practices of power sales, of a definite point of contact between the central-station company and industrial activities, of a more intimate knowledge of the comparative relations existing between general business and central-station barometers, and the charting of all power sales activities should inculcate a new vision of sales activities and should place members of the industry in a position to visualize it from a somewhat different angle.

This force, or effort, might function in the form of a national electric power sales drive, a drive in which the entire industry should take a part collectively with respect to its preparation and individually with respect to the local company activity. An outline of such a drive is given in the illustration herewith. The hub represents an N. E. L. A. national power sales campaign committee, the spokes the various functionaries involved, and the felloe the purpose of the drive, namely, "organized to study, perfect and manage a national power sales campaign in the year 1924, to lay the foundation to carry out the slogan, 'every industry operated electrically for greater production.'" The

accompanying chart indicates the responsibilities of the various functionaries.

The year 1924 is suggested as the time of the campaign, for the reason that time will be required to formulate and develop the plans necessary to carry the project to a satisfactory conclusion and also as that year marks the fortieth anniversary of the first operation of the electric motor from a commercial circuit.


N.E.L.A National Power Sales Campaign
under the direction of the
Executive Committee N.E.L.A
through a working committee composed of representatives of the
Executive Committee N.E.L.A
in charge of finance and policy
Advertising and Publicity Service Bureau
in charge of publicity
Power Sales Bureau.
in charge of Commercial Engineering Features
Technical Section
in charge of perfection of plans to provide production and distribution facilities
Manufacturers
in charge of perfecting plans to produce production, distribution and utilization equipment
Lighting Sales Bureau
in charge of Industrial Lighting.
Electric Vehicle Section
in charge of transportation facilities and industrial trucks
Accounting Section
in charge of accounting and statistics of campaign
Organized to study perfect and manage a National Power Sales Campaign during the year 1924
To lay the foundation to carry out the Slogan
Every Industry Operated Electrically For Greater Production

Plan of National Electric Power Sales Drive.

Electrochemical Processes Division Submits Papers on Industry.

Although hampered somewhat by the reluctance of manufacturers to furnish data and by the somewhat uncertain status of the industry, due to the reaction from war conditions, and further on account of the fact that the industry is young and radical changes are apt to occur during its development, the division on electrochemical processes of the power sales bureau, headed by C. H. McClure, as chairman, adopted certain phases of the industry for investigation and submitted eight papers as its report. The papers were on the following subjects: "Nitrogen Fixation," and "Carbon and Graphite," by C. B. Gibson; "Artificial Abrasives," by J. A. Johnson; "Electrolytic Chlorine," by Karl Horine; "Magnesium," and "Phosphorus," by C. A. Winder, and "Electro Galvanizing," by James Brake, Jr.

Electric Power Applications in Yellow Brass Manufacture Increasing.

The recent and remarkable growth in the adoption and application of electric power by the large manufacturers of yellow brass has been a surprise even to those who have followed this development was shown in the report of the division on industrial electric heating of the power sales bureau, of which N. T. Wilcox is chairman.

The field this successful application creates for the use of the small brass melting furnaces for foundry work and for sizes calling for capacity of from 75 to 300 kw. will afford a fine outlet for surplus energy for existing central-station plants, as there are many small foundries throughout the country that are melting non-ferrous metals which can use this method.

In the discussion following the report, W. L. Miller gave data on wire drawing where electrical heat replaced oil heat, and gave figures to show that the cost of furnishing the heat by electrical energy was less than that of oil. Chairman Wilcox read a letter from the American Brass Co. in which recommendations of several improvements recently made in electric furnaces were commented on. He also read a letter from H. M. St. John, which gave data on thermal efficiency of indirect arc rocking furnace. W. S. Merrill said that manufacturers and uses of brass furnaces had developed this type and suggested that power companies co-operate in the further development of the type. A. C. McMicken compared the cost of electricity and oil in brass furnace work and stated that the efficiency and saving of the electric furnace was found to be more important than a low rate by the two companies which had supplied him with the figures. J. G. Learned approved this position, saying that it was no credit to a salesman to sell power at an unprofitable rate.

Highway, Home and Outdoor Lighting Discussed in Sales Bureau Report.

Lighting of rural highways, particularly at crossroads, dangerous curves and railroad crossings, was urged as a necessary part of the "safety first" movement in the report of the

lighting sales bureau, of which Clarence L. Law is chairman.

As the lighting of country highways over which the traffic is heavy rests with county, state or federal authorities, rather than city or town authorities, educational propaganda must be directed toward these authorities. With the increasing tendency toward interconnection of systems and the growth of transmission lines and extensions of light and power service into the farming and rural sections, highway lighting is the next natural development of the electrical industry along the lines of health, safety and comfort of the public. These phases of lighting sales were covered in the division of street and highway lighting, of which W. T. Dempsey is chairman.

The growing popularity of outdoor lighting for sports of various kinds and the rapid growth of the art of decorative street lighting was also noted. More artistic standards for signal and fire alarm systems offer a field for the designing engineer, as does also the modern equipment where clusters of five or six lamps of an ornamental lighting system are used during the early evening hours, four or five of them being automatically darkened at midnight, or any other specified hour.

Changing the mood of living rooms was described in the report of the residence lighting division of the bureau in a report presented by M. Luckiesh, which dealt with artistic, but practical, lighting. The possibilities are innumerable, and lighting "effects," not merely lighting fixtures, should be sold to the householder.

The report also dealt fully with the necessity of educating architects, building, and other interests outside of the electrical industry, as well as contractor-dealers and others within, to the fact that providing for sufficient outlets in residences was vital to the future development of proper home lighting. Not only is the question of sufficient outlets of the greatest importance in this respect but it also acts as an essential aid in the selling of electrical appliances for use in homes.

The report of the lamp equipment division, of which G. H. Stickney is chairman, suggests that the industry and the public would both benefit by the collection of detailed data upon the subjects of sign lighting, residence lighting, floodlighting, street lighting and other applications requiring special types of equipment.

The subject of holders for suspended globes and cause of globe breakage on pole-type fixtures was discussed by F. C. Taylor. Avoidance of glare in connection with signal lights was urged by E. D. Tillson, who recommended that data on this subject be put in the electric salesmen's handbook.

Labor Conditions Bar Recommendations on Salesmen's Compensation.

Present labor conditions and the steadily increasing cost of living made inadvisable definite recommendations regarding rates of pay for salesmen until conditions are more settled was the report submitted by the compensation of salesmen committee, headed by Adolph Hertz. Considerable research work was done by the committee as a basis for further study and recommendation by a subsequent committee.

In discussion of the report, F. D. Burr spoke of the difficulty utility companies had in competing with concerns in other lines of industry on salaries paid salesmen. Commenting on this, R. S. Hale made a sharp distinction between the power salesman and a saleman who sells commodities, saying the best salesman was the one who could get business at a profitable rate to his company rather than one who could obtain a large volume of business at a low and unprofitable rate. J. G. Learned discussed the sale of utilities securities to company customers. M. S. Seelman and others also took part in the discussion.

It was generally agreed that the sale of securities to persons living in the territory in which a company operates was a good business proposition, this being especially true of the sale of preferred stock. Short time bonds have been sold to advantage in some localities.

Electric Furnace Economy Factor Leads to Use of Large Size Units.

Approximately 300,000,000 kw-hrs. of electrical energy were used during 1918 in producing steel from electric furnaces, stated the report of the electric steel furnace division of the power sales bureau, of which Joseph McKinley is chairman. In addition, large blocks of power were used in the production of ferro-alloys, carbide and similar products, and the total amount was greatly increased during 1919 by the addition of 36 electric furnaces in the steel industry, so that the total number was 323 as against 287 on Jan. 1, 1919. The trend seems to be toward the adoption of large furnaces, the economic factor being sufficient to attract the larger plants in the industry.

In the report attention was called to the fact that the manufacturers are doing everything possible to co-operate with central-station companies in putting them in touch with concerns having under consideration the installation of electric furnaces. That the demand is growing is shown by the numerous inquiries for electric energy rates on electric furnace loads from all parts of the country.

Electric Motor Equipment Means Large Saving for Oil-Well Drillers.

A net saving of $3655.20 in the cost of installation and operation of electric motor equipment for oil-well drilling, as compared with steam-power equipment, is calculated for a 2440-ft. well in a paper submitted by W. G. Taylor as the report of the general power division of the power sales bureau, of which W. E. Murphy is chairman.

Similar economies from the use of electric power for other purposes in oil fields are evidenced in fuel saving, eliminations of unavoidable shutdowns, time saving, uniform pumping speed, lower operating expenses, and lower costs of labor, water and maintenance. The 30-15-hp. motor meets the greatest variety of conditions, developing a synchronous speed of 1200 r.p.m. for pulling, bailing and similar work and 600 r.p.m. for pumping.

N. E. L. A. Convention Report

Accounting Section Sessions

Credit System of Companies Considered too Liberal — Standardization of Accounts Sought — Classification of Merchandise Accounts — Better Accounting Service—Recording Haulage Costs—New Collection Methods

Activities of all committees of the accounting section were briefly reviewed by R. W. Symes, chairman of the section, whose address opened the first session. Four new committees, on credits and collections, insurance, bonus systems, and on federal income tax procedure were created. Four old committees eliminated or merged with other committees were those on accounting efficiency, on cost accounting and statistics, on commission accounting rulings, and on accounting relations with other associations.

Through conferences with various associations, the committee on classification of accounts and accounting relations with other associations is credited with working toward a substantial agreement on all fundamental accounting principles.

Announcement was made that the accounting education committee has completed its work on the elementary course. The advanced course, containing 36 lessons, will be made available by June 1. It is planned to combine the work of this committee next year with the proposed standing committee of the national body, to be known as the education committee.

The committee on motor vehicle records is given credit with having broadened its scope by offering its services to member companies to aid in the installing of transportation cost records. Tribute was paid to the work of the bonus systems committee and its unbiased submission of five types of bonus plans.

Light and Power Companies' Credit System More Liberal Than Necessary.

Placing of the credit and collection system of electric light and power companies on a commercial basis was advocated in the report of the committee on credits and collections, of which David Darlington is chairman. The present policies of the companies along this line are generally found to be more liberal than those of other strictly commercial industries. This deduction was based on questionnaires which the committee sent to member companies, the tabulated results of which formed the bulk of the report.

Because there was no apparent reason disclosed by the questionnaires for such a liberal policy, the companies were urged to place credits and collections upon the usual commercial basis, co-operating with credit associations where they exist.

Generally it was found that credits and collections are handled by a single department. The credit requirements must be met before service is given. Old accounts must be paid up before customers can open new ones. Either guarantees or deposits are generally required. Discounts for prompt payment of accounts vary from 3% to 20%. Appliances or wiring are sold on the installment basis by most of the companies dealing in them.

Many Interested in National Standardized System of Accounting.

Before the passage of another year it is promised by the committee on classification of accounts and accounting relations with other associations, of which William Schmidt, Jr., is chairman, that there will be ready for submission a satisfactory report on the plan for a national standard classification of accounts.

Through correspondence carried on by the committee during the past year with various interested organizations, it was found that much general interest is manifest in regard to the matter of standardized accounting systems. Because of resignations of a number of heads of committees of other organizations with which this committee is working on the problem, the completion of the standardized accounting plan has been delayed.

Merchandise Accounting Classification for Central Station Companies.

Because of the ever increasing number of member companies that have established merchandising departments, and a consequent demand for a classification of accounts to cover that branch of the business, the committee on merchandising accounting, of which C. W. Johnson is chairman, decided to submit without change the classification submitted by the 1917 committee. This was done after correspondence disclosed the fact that, because of the effects of the war and the general condition of labor, proper consideration had not been given the classification.

This classification covers the accounting requirements for operating the appliance department of a central-station company. The detail is in a sense elaborate, but this, it was explained, was done so that it might serve the needs of the large as well as the smaller companies. Included in the report was an index which will enable the members to select only such portions of the classification as are necessary to their individual requirements.

Accounting Service Improved Through Aid of State Representatives.

Representatives in the various states have manifested keen interest, with a willingness to co-operate, in the work of supplying accounting service to member companies, according to the

report of the committee on accounting service to member companies and the monthly bulletin. The chairman of this committee is Frederick Smith, and L. A. Coleman is editor of the accounting pages in the bulletin.

The report was enthusiastic over the support of the state representatives, who have circularized their respective territories, receiving from member companies many problems which were fowarded for solution. Some of these questions treated of subjects covered by specially appointed committees of the accounting section, and were, therefore, referred to these respective committees. The problems dealing with miscellaneous accounting subjects were handled by the service committee.

Mention was made of the creation of a service department at the national headquarters, with a competent accountant in charge who will devote his entire time to the accounting needs of the member companies.

Help Offered Member Companies in Keeping Transportation Cost Records.

Service to member companies in making suggestions and installing cost-keeping records for transportation work, and also to give advice on methods to be used in the actual operation of the transportation department, was offered in the report of the committee on motor vehicle records, of which G. P. Landwehr is chairman.

This extension in the scope of work of the committee is designed to aid in the solution of transportation problems, with a view to arriving at the actual transportation costs for comparison with member companies, and also ascertaining the actual cost for comparison with private concerns as well as for justification of rates charged.

Efficient Accounting Systems Evolved for Buying and Stock-keeping.

Systems for purchase price records, emergency purchase order routine and inventory procedure were chief among the features presented in the report of the committee on purchasing and storeroom accounting, of which W. F. Stevens is chairman.

For purposes of convenience the report was divided into four parts. The first part was devoted to a comprehensive plan for the efficient recording of prices of materials and supplies. This was accompanied by description of forms of card records selected as best adapted, in the minds of the committeemen, to the use of member companies..

The second part was devoted to an emergency purchase order routine system, the discussion of which was amplified by the presentation of charts and blank forms especially designed for the use of a centralized store in one of the larger companies.

The third part, which was devoted to inventory procedure, embodies a study of the problems of the work with reference to its purpose, the routine operations, the time of taking, responsibility for the results, final report, a study of the errors of storehouse operation, precision of results and standard methods of comparison.

In the fourth part there was referred to the succeeding committee the working out of a method for the control of the stock, salvage work, routine of handling obsolete and slow moving material, method of following up purchases, method of handling and accounting for reels and containers, adaptation of Hollerith tabulating system to storehouse work, and other phases of inventory procedure.

Elucidation of Income Tax Problems Given for Guidance of Members.

Important matters relating to federal income-tax requirements and rulings, and papers and articles designed for guidance in the preparation of income-tax reports have been furnished member companies since the first of the year, according to the report of the committee on federal income-tax procedure, of which H. E. Addenbrooke is chairman.

Included in the information thus supplied were three papers entitled: "Brief Suggestions on Accounting as Affected by the Federal Income and Excess Profits Tax Laws and Regulations," "Important Questions Affecting Invested Capital and Net Income," and "Important Suggestions Affecting Consolidated Returns."

These papers were brief and were written from the point of view of the public utility company. In them the attention of accountants of member companies was directed, by discussion and by example, to the great possibility for unintentional errors in the preparation of the returns. The unnecessary expense to which a utility company may be put through lack of care and by unfamiliarity with the law was pointed out.

In addition to the above there was prepared and presented to the chairman of the advanced accounting course, a lesson on the federal income and excess profits tax laws and regulations, with questions and answers especially designed for students.

Improved Methods of Handling Collections and Accounts of Customers.

Economy in the method of billing other than monthly was given considerable space in the report of the committee on customers' records and billing methods, of which J. D. Jacobus is chairman.

Methods of two companies, one that bills certain customers bimonthly and the other quarterly, were cited as precedence for other than the usual monthly billing. In both cases the plan has been in operation for more than a year and the results obtained, together with the economies effected, were reported so satisfactory that it is improbable that either of the companies will ever revert to the monthly billing for residential and apartment customers.

Principal points of economy were found by these two companies in the savings in salaries for meter readers and in the division of billing and customers' accounting. As fewer bills are rendered each month and the number of ledger entries correspondingly reduced, it is apparent that the work can be so arranged so as to make possible a substantial reduction in the number of clerks.

N. E. L. A. Convention Report

Electric Vehicle Section Session

Most Prosperous Year in History of Industry—Making Garage Profits—Lower License Fees Sought—Economy of Electric Truck—Co-operation of Vehicle and Power Salesmen—Electric Vehicle Is a Necessary Unit

During the past year the electric vehicle industry has experienced the most prosperous season in its history, according to George B. Foster, chairman of the electric vehicle section, whose address embodied a summary of the activities and conditions surrounding various phases of the industry.

Manufacturers' reports indicate that all previous records of output have been eclipsed, the maximum indicating as much as 300% over any previous year. Difficulties were noted in the securing of materials and adequate labor, production being somewhat retarded thereby, but conditions were otherwise considered to be most gratifying.

There were no records of failure or other withdrawals from the ranks of manufacturers of electric vehicles. On the contrary, it was noted that a new organization, capitalized at $2,000,000, has entered the field to market both gasoline and electric commercial vehicles. The passenger vehicle branch of the industry is said to be gradually recovering from the effects of the war-time rulings and is supplying distributers with reasonable percentages on accumulated orders.

Public garage service was reported to be in worse condition than it was five years ago, which was then reported as discouraging. Lack of more and better garage service is said to be seriously retarding new sales, particularly of passenger electrics.

Electric vehicle business is today said to be confined to a very few of the larger cities, whereas the smaller cities should be the better hauls, and because of the fact that rates are often lower.

Discussion as to the advisability of merging the vehicle section with the commercial section was participated in by G. A. Freeman, E. W. Lloyd and F. W. Smith. The consensus of opinion seemed to be that it would be to the advantage of the vehicle section to have the support of the large body and the matter was referred to the executive committee.

More Favorable License Fee Differentials Sought for Electric Vehicles.

Inauguration of a campaign to obtain for electric vehicles a favorable differential of 50% in license fees as against gasoline vehicles was the chief feature contained in the report of the committee on legislation, of which G. A. Freeman is chairman. Along this line, manufacturers of electric vehicles are asked to suggest to their large users that they interest themselves in this matter in their own states.

Attention was called to a proposed uniform motor vehicle law which has been prepared by a joint committee representing the American Association of Highway Officials, National Automobile Chamber of Commerce, American Automobile Association and the Highway Industries Association. Copies of this draft are being distributed to all organizations which might be interested in it as a step toward securing a uniform law. This proposed law provides that the electric vehicle pay the same rate per 100 lbs. of weight of vehicle and load capacity as charged for gasoline vehicles, and the same rate per horsepower of motor.

Briefly, the rates proposed, which are in lieu of all taxes and registration fees of any kind of the state or political subdivision thereof, are as follows:

Equipped with—	Per hp.	Per 100 lbs., Gross weight of Vehicle and load.
Pneumatic tires	$0.25	$0.25
Solid tires	0.25	0.35
Iron, steel or other hard tires.	0.25	0.50

This system would probably result, it was reported, in a very slight differential in favor of electrics, which would not be over 10% in any case for a truck, although in comparing a gasoline passenger car with an electric passenger car the difference in favor of the electric would be more in some instances.

Construction, Service and Management for Producing Profit in Garages.

Solution of the problem of conditions necessary to make the garage a profitable business undertaking was offered in the report of the committee on garages and rates, of which Willis M. Thayer is chairman.

The report recommended that garage service be furnished by the central-station companies in the smaller towns, and separate garage companies, in which the central-station companies may retain a certain financial interest, in the larger cities.

It was suggested that, to be profitable, the garage should have a capaciy for at least 60 cars; that these cars may all be electric, or part electric and part gas; that such a garage should have a width of not less than 60 ft. and a minimum length of 150 to 200 ft. Three floor plans of garages coming within the range of these suggestions were presented.

It was advised that the electric garage follow the successful gas-car garage in carrying side lines of all accessories that will yield a profit and help keep down overhead costs.

Garages which care for electric cars should employ a competent battery man whose skill can also be profitably employed in the care of bat-

teries used on gas cars. It was argued that the garage be considered as a business proposition that should stand on its own resources.

Predicts Increased Use of Electric Truck as Economic Power Solution.

Continued increase in the cost of gasoline and the downward trend in the cost of electrical energy are combining to increase the use of the electric truck, according to H. J. Butler and W. J. Burns, of the Oneida Truck Co., Green Bay, Wis., whose paper on "Uses and Abuses of

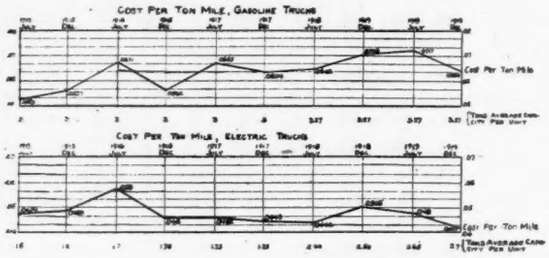


Chart Comparing Operating Cost Per Ton-Mile for Gasoline and Electric Trucks.

Electric Vehicles" was presented at the May 21 session of the electric vehicle section.

Among other features favorable to the increased use of the electric truck it was cited that drivers are more readily trained for the electric than for the gasoline truck; that when the electric truck stops all its mechanism ceases operating; that repair items are negligible because of the absence of delicate parts, and the depreciation cost is consequently low. It was estimated that 75% of all city truck delivery service can be performed more economically by electric trucks.

In the discussion which followed, W. E. Clement pointed to an incident in which manufacturers were said to have sold a number of electric trucks in New Orleans some time ago and then left the customers to shift for themselves. Later the central-station company took up this line of business and sold trucks, of which 40 went to one concern.

George B. Foster, section chairman, cited the New Orleans incident in emphasis of the need of proper garages and supervision in order that the trucks would receive proper care from the start. E. W. Lloyd said that the present time is ideal to sell vehicles as they can be handled without making an investment for extension salesmen who have been taken off of other work and who can be used in this field.

Lower Rates Through Co-operation of Power and Vehicle Salesmen.

Pointing to the inseparable interests of the electric vehicle and the central-station industries, the report of the electric vehicle and power sales bureau co-operation committee, of which E. S. Mansfield is chairman, emphasized the possibility of lower rates through proper combinations of power rates for charging electric vehicle batteries and for other commercial purposes. Salesmen for electric vehicles and for central-station companies, it was recommended, should study each other's branch sufficiently to be able to co-operate and give the customer and prospective customer better service and better terms.

As evidence of the extent of power load interest which central-station companies may have in the electric vehicle business the operations of three firms in one of the largest cities was cited. These three firms own a total of 444 electric vehicles which consume an average of 17,000 kw-hrs. per day for at least 300 days per year. Assuming a rate of 2 cents per kw-hr., the income of the central-station company through the operation of these 444 vehicles was over $100,000 per year.

Operating Cost of Electric Vehicle Half That of Gasoline Haulage.

The cost of operating the electric vehicle, taking all the factors into consideration, is placed by the report of the committee on transportation engineering, of which F. M. Feiker is chairman, at about one-half the cost of gasoline transportation under similar operating conditions.

This report favored the conception of the electric vehicle as merely one element in the general field of transportation rather than a competitor of other classes and agencies of transportation. The best interests of the electric vehicle industry are served when that vehicle is considered a co-operative unit in the general transportation scheme. Educationally this was considered the only method of approach toward a proper understanding of the function of the electric vehicle

In the discussion of this subject E. W. Lloyd said there was greater need of selling the idea of the electric vehicle to the central-station companies and other interested affiliations rather than devoting too much energy with the idea of getting purely technical courses established in colleges. He pointed to San Francisco and Los Angeles as excellent fields for the electric vehicle if those most interested would develop the business.

Economy of Electric Trucks When Operated Within Prescribed Limits.

That electric trucks are operated with much more economy and satisfaction than any other type of motor truck when used within the mileage capacity of the batteries is the contention of C. A. Street, of the Walker Vehicle Co., Chicago, whose paper on "The Electric Truck Industry" was presented at the May 21 session of the electric vehicle section.

For city use the electric truck was proclaimed supreme, but the gasoline truck was credited with being pre-eminently fitted for the longer suburban and interurban hauls. On these substantiated facts, Mr. Street has based the possible saving of thousands of dollars to American industry.

Complete and accurate records of operating costs of large users of both gasoline and electric trucks were cited to prove that a 5-ton gasoline truck, operating an average of 40 miles a day, costs $5 to $10 a day more than an electric truck doing the same work. At the rate of $5 a day for 10 years of 300 working days, it was figured that the user of a 5-ton gasoline truck for work that the electric truck could do would be wasting $15,000.

EDITORIAL COMMENT

A Constructive Convention

History in the electrical industry was made at Pasadena, Cal., this week during the progress of the forty-third annual convention of the National Electric Light Association, which closed Saturday after four days of constructive effort that will spell much for the future development of the industry. Coal conservation, development of water-power resources, railway electrification and the need and value of co-ordination and co-operation between all branches of the electrical industry were some of the outstanding features discussed at both the general and section sessions.

The convention was in the major sense one of business organization to meet present and contemplated exigencies, in which there participated leaders from the central-station companies, electrical manufacturers and jobbers. Aside from the many subjects weighed, discussed and acted upon, there was much accomplished toward the solidification of the whole industry.

Among the sections of the association the work of the technical and hydroelectric section was particularly noteworthy. This section, always ably directed, has striven year after year to find means to overcome the effects of increasing material and labor costs, to develop or secure the development of needed new equipment and to find ways and means of making existing equipment produce its full service every day of the year. That the past efforts have been largely successful is testified to in the daily performance of central-station and utilization equipment all over the country.

Many new developments were disclosed at the convention and new work, in greater volume than ever before attempted, was laid out for the coming year. A single standard of service voltage was recommended. This recommendation, simple in itself, will have a far-reaching effect on the industry when it actually comes to pass. Manufacturing and merchandising will be cheapened and the public will be relieved of much confusion in the purchase of appliances, thus making it easier to supply the convenience of electricity in the average home. Other activities of the section are of great importance to both the central-station industry and the general public. Lamp development and utilization, meters and metering problems, motor and power applications, generation and distribution of energy and safety and reliability of service have all felt the influence of this body.

The work of the commercial, accounting and electric vehicle sections was of importance to the delegates and many new, profitable and constructive ideas could not help but be gleaned from the papers and discussions at the meetings of these sections.

Reading of the proceedings of the convention will show that President Ballard's expressed hope that the deliberations would aid in conserving the forces of nature so that production will be increased was fulfilled at Pasadena.

Public Opinion on Electric Automobiles

It is interesting to note the attitude of the public, as reflected in the comment of daily newspapers, on the situation regarding the market for and use of electric automobiles. In general, the comment has been one of relief that the time is fast approaching when the rapidly dwindling supply of gasoline and its consequent high price will cease to be a menace to users of automobiles for both pleasure and commercial purposes.

A recent editorial in the Chicago *Journal*, under the title of "The Hope of Car Owners," comes close to hitting the nub of the situation. In part, the editorial says:

> "Nearly every year for more than a decade, Charles Steinmetz has been predicting the advent of the cheap electric automobile, which was to send the gasoline car to the scrap heap. Mr. Steinmetz has given the specifications of his 'car of the future.' It is to have a first cost of not more than $500 for the cheaper makes, a speed of around 20 miles per hour, and the ability to go 200 miles without recharging. Such a car, he declares, would eliminate the gasoline car except for cross-country driving.
>
> "Probably it would, but for years the world has awaited the test in vain. The cheap electric car does not come, and it never looked less likely to dominate the field than now. Yet never did the prediction have a more welcome sound. With gasoline mounting in price, with a shortage threatened for the season and a yet greater shortage in seasons to come, the

auto-owning public is beginning to ask what it must do to be saved.

"Before electricity can displace the 'gas' car, someone must develop the 'right' sort of storage battery, and that appears to be a most difficult task. Other suggested remedies are to use industrial alcohol and the heavier oils. * * *"

With electrical development going forward with rapid strides at the present time there is no question but what the day of the low-price electric automobile is approaching. The opportunity is here and the electrical industry, like it does in most cases, probably will make the most of it. With the many new discoveries and applications now being made in the electrical industry it can be stated with a degree of certainty that can hardly be questioned that the low-price electric automobile is on its way to the public. Its coming will demonstrate another manner in which electricity and the electrical industry has provided a surcease for the mechanical ills of the public.

Improving Urban Transportation

Returns from the census of population taken early this year indicate very substantial continued growth of our cities, only a relatively small number of cities having remained stationary or fallen back. Our population is becoming predominantly urban at the expense of the rural districts and this is causing no little concern in the minds of many thinking people in the cities as well as in the country. The fact is that the rapid growth of the cities is bringing up for urgent consideration numerous problems, of which local transportation is one of the most difficult.

The part that urban transportation plays in the life of the large cities has been forcibly brought home to them when the chief means of transport have suddenly been cut off by strikes of the employes. Then it was realized that the electric street car, elevated or subway lines carried the bulk of the people to and from their places of employment and recreation. Passenger automobiles, omnibuses, jitneys, trucks and other improvised conveyances cannot furnish equivalent service for the bulk of the people, either in capacity, speed, convenience, comfort or cost. No other means of transport is as practical or economical. Thus the absolutely essential character of electric urban transportation has been frequently demonstrated, and yet by a vicious policy of our American cities the companies that furnish this highly essential service have been hampered in their development and harassed at every opportunity.

An abundance of new light on the urban transportation problem, especially as it is related to city planning or, rather, systematic city building, was presented in a scholarly paper read by Mr. J. R. Bibbins before a joint meeting of electrical engineers in Chicago last week and reported in another part of this issue. He showed that transportation should be one of the most vital features of city building and that it affects the welfare of the community to a far greater extent than is commonly recognized. It has a very close bearing on many phases of community life and should therefore be developed on the lines of the best engineering thought and absolutely freed from its present blight of political interference, which characterizes it in so many of our cities. Without attempting to review Mr. Bibbins' many excellent points, comment on one or two of them may be appropriate.

In the central-station industry electrical men have shown that partly by cutting down the peak and by increasing the off-peak load the business has been made more profitable so that in many cases it has been possible to meet present higher costs without increased rates or with but small rate increases. In electric urban transportation these ideas have not been systematically developed. Staggering of the hours of opening and closing business can materially spread out the peak or rush traffic, but has not become popular because its value has not been clearly pointed out to the mass of employers and employes in most cities. During the war its advantages were demonstrated in several cities, notably Washington and Philadelphia.

Filling in the valleys of the load or traffic curve holds forth greater promise of success. It permits of making better working schedules for the car and train crews, it increases the load-factor of the system and brings in additional revenue. Slow increase of off-peak traffic comes with growth of the riding habit as the city develops. Substantial off-peak traffic can be developed by hauling parcels, perishable goods, light freight, baggage, etc., between the central parts of the city and the outskirts or suburbs, thus reducing the heavy trucking that is rapidly destroying city pavements. Such traffic can be carried on at night and at other times without interfering with the passenger traffic. It is worthy of active development.

Electric urban transportation cannot be allowed to languish. It must be relieved of many of the extra tax burdens now imposed on it or given additional revenue through new traffic or higher fares. Its development must be continued systematically with the building of the city or the latter is bound to suffer more even than it does now from the dearth of these facilities.

CURRENT EVENTS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

ELECTRIC POWER CLUB TO ESTABLISH CENTRAL HEADQUARTERS.

Board of Governors Decide to Broaden Scope of Activities of Organization at Annual Meeting Held at Chattanooga, Tenn.

At the annual meeting of the Electric Power Club, held at Chattanooga, Tenn., May 5-8, a suggestion that the name of the club be changed to the "Associated Manufacturers of Electrical Apparatus," or some similar appellation, was voted down, but the matter of change of name was referred to the board of governors for further deliberation and for a report to be made at a later meeting.

The change in name was suggested as the work now being handled by the club is of a broad engineering character and covers many phases of the electrical industry. In the near future the club will enlarge the scope of its work to include section divisions and will establish a central headquarters with a paid secretary in charge.

The organization now has ten organized sections under the following names: transformer section, industrial control section, power, switchboard and oil circuit-breaker section, motor and generator section, turbodriven apparatus section, storage-battery section, electric welding section, electric furnace section, portable electric tool section and electric measuring instrument section.

At the annual election the following officers were re-elected for another year: James Burke, Burke Electric Co., Erie, Pa., president; A. L. Doremus, Crocker-Wheeler Co., Ampere, N. J., vice-president; C. H. Roth, Roth Brothers & Co., Chicago, secretary, and R. J. Russell, Century Electric Co., St. Louis, Mo., treasurer.

A. I. E. E. HAS LONG LIST OF PAPERS FOR ANNUAL CONVENTION.

Thirty-Sixth Annual Session of Organization Will Be Held at White Sulphur Springs, W. Va., June 29-July 2.

Following the custom established several years ago the convention committee in charge of the thirty-sixth annual meeting of the American Institute of Electrical Engineers at White Sulphur Springs, W. Va., June 29-July 2, has arranged to hold all the technical sessions in the mornings, leaving the afternoons and evenings open to the members to increase their acquaintanceship in the institute or devote to recreation.

A tentative program has been arranged which calls for the opening of the convention with the presentation of President Calvert Townley's address followed by the technical committee's report. Six sessions have been planned under the auspices of the various technical committees.

The electrical machinery committee, of which B. A. Behrend is chairman, will give a symposium on "Temperature Conditions Prevailing Inside Large A-C. Generators," with papers by Philip Torchio, B. G. Lamme, W. J. Foster, C. J. Fecheimer, F. D. Newbury and R. E. Gilman, and a session on "Welding," with papers by men who have made a study of this part of the branch of the industry.

The protective devices committee, of which D. W. Roper is chairman, will hold one session at which papers will be read by C. P. Steinmetz, F. H. Kierstead, H. B. Dwight and B. Gross. Sessions of the special committee on determination of power-factor, of which S. G. Rhodes is chairman, and the power stations committee, Philip Torchio, chairman, will also be held, with a miscellaneous session to conclude the convention. At the latter the following papers will be read: "A-C. Commutator Motors," by J. I. Hull, General Electric Co.; "High Tension Insulator Porcelain," by W. D. Peaslee, Jeffrey-Dewitt Insulator Co.; "Reactive Power and Magnetic Energy," by Joseph Slepian, Westinghouse Electric & Manufacturing Co., and "The Corona Voltmeter II," by J. B. Whitehead, professor of electrical engineering, Johns Hopkins University and T. Isshiki, engineer, Shibaura Engineering Works.

CO-OPERATION IS KEYNOTE OF JOBBERS' CONVENTION.

Discussion of California Electrical Co-operative Campaign Features Meeting of Electrical Supply Jobbers' Association.

An obvious appreciation of the value of the closest co-operation between the various branches of the industry was the outstanding feature of the annual convention of the Electrical Supply Jobbers' Association held at Del Monte, Cal., May 12 to 14. Inoculated, perhaps, with the splendid spirit of co-operation that permeates the electrical industry on the Pacific Coast, the jobbing fraternity in convention assembled expressed in no uncertain form its desire to work in complete harmony with the other branches of the industry.

What this means was best indicated by the vote of the association, authorizing its executive committee to represent the jobbers at the annual convention of the National Electric Light Association, at Pasadena, Cal., May 18-22.

The benefits of co-operation, as it is known in the West, were ably outlined in the session on Friday morning, which was given over entirely to a discussion of the California Electrical Co-

operative Campaign. This movement, which was started two or three years ago, has grown to such proportions that it is now considered as the most important business stimulating factor in the industry.

The campaign is directed by an executive committee composed of representatives of the manufacturers, jobbers, contractor-dealers and central-station companies. Three field representatives and an advertising representative are employed, whose duty it is to do educational work among architects, builders, electrical dealers, etc. As a result of the campaign hundreds of retail electrical stores have been either created or modernized, architects and builders have been "sold" on the idea of complete electrical equipment for the home and the public in general is fully cognizant of the many advantages of electricity.

This whole subject was discussed in detail by several speakers who dealt with the campaign from the standpoint of the jobber, manufacturer, central station and dealer.

Outline of California Electrical Co-operative Campaign Given.

Lee H. Newbert, chairman of the advisory board of the campaign and commercial manager of the Pacific Gas & Electric Co., introduced the subject, giving a comprehensive outline of the principal features of the campaign, its organization, finances, etc.

D. E. Harris, vice-president and sales manager of the Pacific States Electric Co., spoke of the jobbers' viewpoint of the campaign. He presented statistics showing the tremendous possibilities for the sale of supplies, as the educational work becomes more and more widespread.

The manufacturers' viewpoint was discussed by Garnett Young, president of Garnett Young & Co., who also pointed out the possibilities of the campaign. R. M. Alvord, General Electric Co., San Francisco, supplemented Mr. Young's statements, outlining his views of how similar campaigns could be started elsewhere. Whereas contributions to the California movement were originally made by the associations representing the various branches of the industry, Mr. Alvord thought it more desirable to solicit subscriptions from individuals.

C. L. Chamblin, president of the California Association of Electrical Contractors and Dealers, gave the contractor-dealers' version of the campaign. He told of the greater appreciation of contractor-dealers of their own responsibility to the public and to the industry and dealt at some length with other improvements that have resulted. He particularly emphasized the cordial relations that exist in California between contractors and central-station companies.

So deeply impressed were the visiting members with the benefits of co-operation of the California variety that a motion was passed authorizing the secretary to reprint the various addresses and distribute them to all central-station companies, contractor-dealers and members.

The convention opened with a session Tuesday evening at which Robert Sibley, of San Francisco, presented an illustrated lecture on "The Status of the Electrical Industry in the West and Its Future Possibilities." Views of many of the important hydroelectric projects were shown.

Parallel sessions of the Atlantic, Central and Pacific divisions were held on Wednesday morning at which routine business was transacted.

Conditions in Jobbing Business in Different Parts of Country Compared.

An interesting feature of the Atlantic division program were addresses by C. C. Hilles, Electric Appliance Co., San Francisco, and F. D. Van Winkle, Post-Glover Electric Co., Cincinnati, O., comparing conditions in western and middle states with those of eastern states. Mr. Hilles explained the problems of the Pacific Coast jobber and told of some of the benefits that houses in his territory have been able to secure by reason of their co-operative efforts. He also spoke of some of the ills of the industry and suggested remedies. For instance, he referred to the practice of some manufacturers of continually appointing new distributers although unable to make deliveries to their existing ones. He also called attention to the practice of some manufacturers' salesmen of soliciting orders from the trade and then turning these over to a jobber who does not ordinarily carry a stock of that manufacturer's goods. Mr. Hillis advocated a "net price" basis, both for buying from the manufacturer and for selling to the trade.

This matter was also brought to the attention of the general meeting at the Friday morning session and a motion was passed authorizing the appointment of a committee to make a study of the question.

A. M. Little, Mohawk Electrical Supply Co., Syracuse, N. Y., chairman of the Atlantic division, discussed the question of organizations for jobbing houses. He presented an organization chart of his own company which was used as the basis for the discussion. A committee was authorized to prepare a typical organization chart for the guidance of members.

Appropriation Made for Publicity Campaign for Association.

A general meeting was held Thursday morning at which the report of the publicity committee was presented by A. M. Little, chairman, and Ainslie A. Gray, advertising counsel of the association. The report dealt with the campaign of advertising that was conducted during the past fiscal year and asked for an appropriation of $25,000 so that the work could be continued. Mr. Gray briefly outlined the plan of the proposed campaign, which includes trade-paper advertising supplemented by broadsides, booklets, etc. After a brief discussion the appropriation was unanimously voted. The consensus of opinion seemed to favor a larger amount, as the benefits of the campaign just concluded seemed evident to all.

F. A. Wilson-Lawrenson, Union Carbide & Carbon Corp., New York City, outlined a new merchandising plan which his company is about to inaugurate. It provides for establishing a minimum quota of business expected from each territory and dividing this quota among the jobbers. As long as each jobber disposes of his quota no new distributers will be appointed.

Should any jobber fail to dispose of his quota, the remaining jobbers in that territory are given an opportunity to absorb it. The plan was enthusiastically received by the convention.

Work of Society for Electrical Development Outlined.

J. M. Wakeman, general manager of the Society for Electrical Development, Inc., spoke of the revived interest in the society's work since the close of the war. The new executive committee personnel includes the most prominent men in the industry and the work being done is more effective and also more needed than ever.

W. E. Robertson, Robertson-Cataract Electric Co., Buffalo, N. Y., supplemented Mr. Wakeman's statements regarding the work of the society and pointed out how his company, although it had withdrawn its membership, had rejoined recently and was taking a more active part than ever.

E. W. Rockafellow, Western Electric Co., New York City, also highly commended the work of the society and urged a personal inspection of the work being done at New York headquarters.

On Thursday evening a special meeting was held at which W. L. Goodwin delivered an inspiring address, mainly dealing with his appreciation of the support the jobbers have given him during the past year. He urged that jobbers assume their full share of the responsibility of popularizing electricity. Particularly is there a need for new capital and one way to aid in bringing the needed money into the industry is for all men engaged in the industry to show their own confidence in its future by investing their own funds in it.

An entertainment program characteristic of the jobbers' conventions and supplemented by the hospitality of California was provided for the enjoyment of those present.

Virtually all eastern delegates and guests journeyed to Del Monte via special train over the Chicago & Northwestern, Union Pacific and Southern Pacific railways. Many diversions were provided enroute in the form of side trips. The General Electric Co. and National Lamp Works were especially active in lightening the monotony of the overland trip.

TRANSPORTATION IN ITS RELATION TO CITY BUILDING.

Healthy and Economical Growth of Cities Depends Upon Good Local Transportation, Says Traction Expert.

The inter-relations between city growth and prosperity and local transportation conditions were covered in a paper presented May 12 by J. R. Bibbins, Arnold Co., Chicago, before a joint meeting of the American Institute of Electrical Engineers and the Western Society of Engineers in Chicago.

It was pointed out that the prosperity of a city was closely related to the conditions of its transportation system. Urban population is found to double in from 10 to 40 years in the majority of active well-situated cities. Thus within the limits of a single lifetime an active city must provide for double its present population. This increase can be provided for only by increasing density of population or by extending the city area. For comfortable, healthful living conditions, building heights in excess of three stories are unsatisfactory so that ultimately city areas must be increased to care for the population.

To met the growth in dimensions of a city its transportation system must increase its trackage, its rolling stock and its speed of operation. Failure of the transportation to grow with the city hampers the city's growth, and failure of the city to support its transportation system actually stops its growth.

The increased trackage, the average increase in length of ride and the improved service demanded, together with the rush-hour tendency, require heavy expenditures on the part of the transportation company. With limitations of fare, the transportation is now and will be more hampered in the future unless means of relief are found. One possible source of increase income is from the use of street railways for package and perishable freight hauling.

SCHOOL LIGHTING DISCUSSED IN CHICAGO AND MILWAUKEE.

Professor Caldwell of Ohio State University Addresses Illuminating Engineers and Educators in the Two Cities.

The movement for better lighting of school buildings was given impetus by an illustrated lecture delivered by F. C. Caldwell, professor of electrical engineering, Ohio State University, before the Chicago Section of the Illuminating Engineering Society on the evening of May 13, the meeting being held at Lewis Institute, Chicago. On the following evening Professor Caldwell presented a similar address at the School of Engineering of Milwaukee, this meeting being conducted by F. A. Vaughn, local representative of the society in Milwaukee.

Professor Caldwell showed that during the past hundred years an extraordinary increase has occurred in the use of the eyes for reading and other close visual work, and now even children in the kindergartens have to use their eyes intensively. Data from various sources indicate an increase in eye defects with the progress of the pupils through the schools and relatively small improvement in this matter during the last third of a century. It has been shown conclusively that the effort to do exacting visual work under inadequate or improperly directed and distributed light is harmful to the eyes. While children are increasing the use of their eyes it should be under the most favorable conditions for seeing. All these facts call for the best possible lighting in the schools.

Dependence on daylight alone is not advisable, because of dark days and the desirability of utilizing the investment in school buildings to the utmost for evening classes and for community centers. Tests were made to show the higher acuity of vision obtained with higher illumination intensities. The latter may accelerate the progress of the pupils through the schools, thereby effecting important economies

to the community and the pupils themselves. The cost of a good system of lighting may be but little more than that of an inferior one, but even if it were twice as great it would still constitute only a very small fraction of the cost of operating the school.

In closing his address, the lecturer dwelt on the opportunity in the schools of teaching the pupils the proper use of the eyes and of light. Since we must use our eyes so much in our daily tasks, it is of very high importance that we do so efficiently and so as to conserve the eyesight. Likewise, light must be used to aid and not harm the eyes. At present little or no effort is made to instruct the teachers on these points; the textbooks they use are almost entirely silent on the subject. The writers of texts on physiology and physics can doubtless be impressed with the value of including vision and lighting as topics of study. At the same time good lighting of the schools will serve as an important object lesson on the impressionable minds of the young pupils and they will be more likely to insist on good lighting also at home.

The subject was discussed at some length at both meetings. As a result of the Milwaukee meeting it is likely that regulations covering school lighting may be drawn up in the state of Wisconsin.

WATER-POWER NECESSITY IS TOPIC AT COAST CONVENTION.

Pacific Coast Section, N. E. L. A., Holds Fourth Annual Convention as Delegates Gather for National Association Meeting.

The necessity of the further development of water power resources and the electrification of steam railroads were the main subjects discussed at the fourth annual convention of the Pacific Coast Section of the National Electric Light Association, held in the Hotel Huntington, Pasadena, Cal., May 17, just preceding the convention of the national association. There was a large attendance at the session, including many delegates to the national convention who had arrived in Pasadena early.

The business session was opened by an address from A. Emory Wishon, president of the section, after which reports of other officers and committees were presented. The general session in the afternoon started with a paper by J. E. Woodbridge, San Francisco, of the Sierra & San Francisco Power Co., on "Future Fuel Prices as Affecting Railroad Operation in California," in which he pointed out the present high price of fuel oil and the shortage of oil existing, stating that in a short time the supply would be exhausted and using this as an argument for the immediate development of hydroelectric production of power as a means of averting industrial disaster.

John A. Britton, of the Pacific Gas & Electric Co., directed attention to the necessity of developing water-power resources as a measure for the conservation of the oil supply and said the approaching crisis in this situation should be met by restricting the use of gasoline and devoting hydroelectric energy to uses for which fuel oil is now used.

The commercial aspect of railroad electrification was discussed jointly in a paper presented by E. B. Criddle, manager of the railway division of the Westinghouse Electric & Manufacturing Co., W. L. Frost, of the Southern California Edison Co., and G. B. Kirker, the position being taken that a power company whose business is the production and distribution of power can more economically provide energy for railroad operation than can the railroad company itself. R. W. Clark, of the Puget Sound Power & Light Co., Seattle, Wash., presented his observations on railroad electrification in the Northwest and the supply of energy by central-station companies for their operation. This phase of the subject was also discussed by R. E. Fisher, of the Pacific Gas & Electric Co., San Francisco.

The advantage of co-operation with architects and builders in securing an adequate number of outlets for electric service in homes and buildings was pointed out in a paper presented by Garnett Young. In a discussion on the paper Mr. Britton pointed out the necessity of not only co-operating with the architect and builder but also of educating the public in the use of appliances. Similar views were expressed by L. H. Newbert, of the Pacific Gas & Electric Co.

Clyde Champlin, president of the California Association of Contractors and Builders, read an interesting paper on "Home Building," in which he called the home "the greatest central station in the world," and urged the electrical men to keep up the education of the public as to the use of electrical devices. In a paper on "Wiring and Outlets in Buildings," H. L. Harper, of the Western Electric Co., advocated proper provisions for future wiring as well as the present and said that this idea must be impressed on the public mind so that buildings of the future would be properly equipped.

R. M. Alvord, of the General Electric Co., spoke on the California co-operative campaign, by which provision for future appliance use had been kept in the public mind, and referred to the demonstration homes kept by the companies in Los Angeles and San Francisco and told of their influences among home builders. Mr. Newbert read a report in which it was shown that co-operation among architects, builders and electrical dealers had enhanced the business of the electrical industry to a marked degree.

Other papers read and discussed were the "Value of Appliance Solicitors," by A. W. Childs; "Electrical Advertising," by Howard Angus, and "Motor Ratings," by John Hood, of the General Electric Co., C. E. Ingalls of the Crocker-Wheeler Co., and Carl E. Johnson, of the United States Motor Co.

In the business meeting G. E. Armstrong presented a paper on "Relay Protective Systems," and E. A. Quinn one on "Power-Factor and Rates." The following committee reports were presented: by T. E. Bibbins, on co-operation; H. N. Sessions, on membership; I. W. Alexander, on publicity; R. M. Downing, on engineering; R. R. Ferguson, on accounting; C. R. Stahl, on constructing accounting, and by A. B. Carpenter, on standardization of titles. The commercial section was marked by a discussion on the value of proper illumination by F. S. Fagan; on the storage of water at a higher ele-

vation by E. B. Walthall, and was concluded with a paper by J. O. Case, who analyzed unelectrified possibilities.

Officers of the section elected for the ensuing year are as follows: L. H. Newbert, manager, commercial department, Pacific Gas & Electric Co., San Francisco, president; A. B. West, Bishop Light & Power Co., Bishop, Cal., first vice-president; J. B. Black, second vice-president, and A. E. Morphy, secretary, Southern California Edison Co., treasurer. The executive committee is composed of the officers and the following: A. E. Wishon, George A. Campbell, C. M. Einhart, R. S. Masson, William Baurhite, H. H. Jones, W. M. Shepard, Henry Bostwick, C. R. Butte, W. M. Deming, D. E. Harris and K. E. Van Kuran.

TELLS TEXAS UTILITY MEN HOW TO CREATE SECURITY MARKET.

New York Banker Discusses Financial Situation at Meeting of Southwestern Electrical and Gas Association.

The public utility companies of America, struggling "between the upper millstone of regulation and the nether millstone of rising costs of operation," can attract new capital and offer a safe investment only by creating a genuine and effective interest among their customers and the people in the territories they serve, George L. Burr, manager of the bond department of the Guaranty Trust Co., New York City, told members of the Southwestern Electrical and Gas Association at its annual convention in Galveston, Texas, May 13-15.

Public utilities must be regarded not as outsiders but as integral parts of their communities which must be fostered and developed as much as any other industry, Mr. Burr said. He advocated the sale of the securities of public utility companies among their customers, who then become owners or creditors, depending on whether they purchase stocks or bonds. They will then be directly and personally interested parties both from the standpoint of the community and of the companies, and outside investors will be attracted by the assurance that the companies will receive the same consideration as the other home industries in the territory served.

Mr. Burr said, in part: "It is generally felt among investors that many public utility companies have not had the public support which is due to them as honestly and ably managed public servants and that the problems of these companies and the just deserts of their owners and creditors have not been appreciated by the public bodies. It is therefore feared by many that, as a result of the combination of these circumstances and the rising costs of operation, financial disaster for many companies may be just around the corner in the shape of possible disappearance of 'net after taxes.'

"Compare, on any such basis, the case of the public utilities with the flexible earning power and favorable current asset position of an industrial company and it is not difficult to understand why it is almost impossible today to finance any but the exceptionally fortunate public utilities. I do not wish to paint too black a picture but I would be neglecting my duty if I did not present to you quite frankly the point of view of the investing public for whose funds your companies must sooner or later become bidders.

"On the other hand, it is obvious that, in order to enable the public utilities to expand their facilities to meet the requirements of their communities, they must be in a position to attract new capital; but new capital cannot be obtained for any enterprise which has not sufficient credit to attract such capital from investment in other undertakings. To state the matter somewhat differently, the investing public is no longer in the position of a purchaser of the securities of your companies. The companies are in the position of purchasers and are in the market for free investment money which has the whole world for its field. What must your companies offer in order to buy the use of that money?

"First, they must, of course, offer the prevailing rate of return as determined by the demand for money and its supply. This rate will fluctuate as a result of many causes but whatever it is it must be met or those who have free funds will invest them in other enterprises which are willing to bid what the investor thinks his money is worth.

"Second, in order to meet the competition for money from industrials, your companies must offer something that will make as attractive a background for investment as the liquid statements of such companies and their ability to meet rising costs by increased prices for their products.

"Just as no one industry can be divorced from other industries, no public utility can be forever separated and treated apart from the community which it serves. The two must stand or fall together. A street railway whose development is throttled by a rigid rate structure cannot aid in the opening up of new residential districts without which rents will inevitably rise in the territory already served. A lighting company whose 'net after taxes' is not sufficient to appeal to additional capital, cannot give the service which attracts new industries to whose owners and employes the retail stores sell their merchandise. Conversely, you cannot have a growing utility serving a district which has ceased to develop, and no competently managed utility will lag behind in a growing territory."

LORAIN ELECTRICAL INTERESTS TO HOLD SHOW.

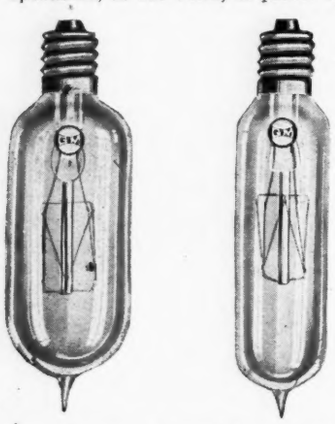
Electrical interests of Lorain, O., including the Lorain County Electric Co. and the contractor-dealers of the city, will hold an electrical show, May 25-30, it being the first show of its kind ever given in the city. There will be about 30 exhibits at the show, including special fire alarm equipment, telephone apparatus and wireless telegraphy equipment, which will be exhibited by the Lorain high school students. Another exhibit will be the Weaver "Minnow" aeroplane, which was one of the features of the recent Columbus (O.) show. J. C. McClendon, new business manager of the Lorain County Electric Co. has been active in arranging for the show.

NEW APPLIANCES

Newly Developed and Improved Electrical and Mechanical Apparatus, Appliances, and Devices Now Being Placed on the Market

G-M Tungsten Switchboard Lamps.

A 15-watt, 12-cp. tungsten lamp, for switchboard signal work, has been placed on the market by Lord Manufacturing Co., 105 West 40th street, New York City. This lamp is intended for operation, at 150 volts, in places now



Tungsten Lamps for Switchboard Signal Service.

using the customary 32-watt, 8-cp. 140-volt carbon lamps.

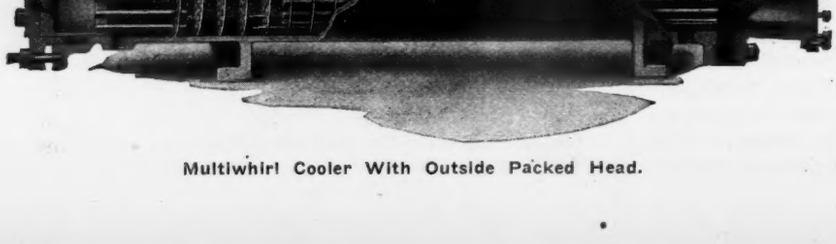
It is claimed that the new lamp will operate on half the power, give twice the light, give off much less heat and burn twice as long as the old carbon lamp. It is made in two sizes of bulbs, the smaller bulb being 0.75 in. in diameter and the larger bulb 1 in. in diameter. These lamps may be supplied for 125-volt operation if desired. The lower-voltage lamps and the lamps in the larger bulbs have a longer life than the high-voltage or smaller-bulb lamps.

Cooler for Lubricating and Quenching Oils.

In the past few years the cooling of lubricating oils for use in turbine bearings, reduction gears and similar heavy-duty work and oil for heat-treatment quenching systems has received considerable attention by engineers. It has become imperative to devise a means of cooling this oil so that it can be used over and over again and still be maintained at the proper temperature to secure the most efficient operation.

To meet this situation the Griscom-Russel Co., 90 West street, New York, N. Y., has developed a device known as the "multiwhirl cooler." In this device the oil is constantly circulated over the cooling elements and so is maintained at practically a constant temperature. The apparatus takes its name from the whirling path of the oil, which path is produced by the use of a helical baffle which directs the oil in its flow without appreciably retarding its progress. This baffle also serves to bring the oil into intimate contact with the cooling surface and thus insures a high rate of heat transfer. The shell is made of cast iron and the tubes are made of seamless drawn brass or copper, expanded into a fixed tube-plate at one end and into a floating head at the other. This construction permits expansion and contraction without strain on the tube joints.

The cooling of quenching oil insures maintenance of the quenching bath at a fixed temperature and also permits the use of cheaper grades of oil.

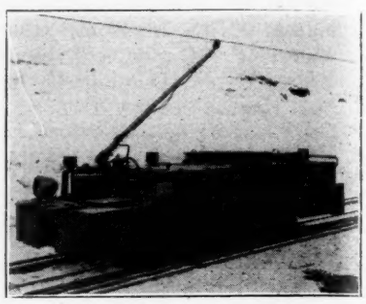


Multiwhirl Cooler With Outside Packed Head.

Gathering Locomotive.

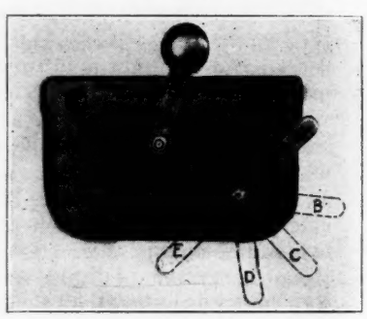
In gathering work in mining and similar operations there is a considerable amount of braking of motive equipment that has to be done, owing to the numerous stops that must be made for throwing switches at the entrance to room necks and couplings made to the individual cars. The consequence is that, with the hand brake, considerable physical effort is used by the motormen, who, if careless, develops the habit of stopping the locomotive by reversing the motors, with consequent damage to wheels, motors, gears, etc.

The General Electric Co., Schenectady, N. Y., has announced the development of a new electric gathering locomotive, which has several interesting features. The braking is done electrically, and is obtained by designing the controller so that, when the reverse cylinder is set at the braking position, the motors are turned into self-excited generators, the energy being absorbed in the main resistors. On a level track the motorman can bring his train to a dead stop without using the hand brake at all, but on a grade, since there is no energy developed when the wheels have stopped



Improved Type of Electric Gathering Locomotive.

turning, it is necessary to set the hand brake to hold the train. The controller is provided with a three-position indicator, so that by setting it, forward, reverse, and braking are all obtained by moving the handle in one direction. Another feature of the controller is that



Controller for Gathering Locomotive, Showing Positions of Forward, Reverse and Braking.

the points are so arranged that the motorman cannot get to parallel until he has been through series, and hence he cannot get slow speed by leaving the reverse cylinder in the parallel position and running on a resistance point, which has a bad effect on the resistors, and uses much more energy than if the motors were in series.

New E-Z Wire Bracket Combines Three Attachments.

A combination of three distinct attachments is claimed for the new "E-Z Wire" three-piece bracket recently put on the market by the Peerless Light Co., Chicago, Ill. The arm is the "E-Z Wire" single piece arm of solid brass, which gives the service formerly secured by assembling a number of individual attachments. Another part of the three-piece bracket in a standard slip canopy and a ⅜-in. crowfoot on which all the service parts are brushed brass finish.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Connecticut Electric Co., Hartford, Conn., has awarded a contract for the construction of a 1-story administration building to be located at 540 Flatbush avenue.

Polly Manufacturing Co., 431 Chestnut street, Milwaukee, Wis., has been incorporated with capital stock of $25,000 for the manufacture and sale of lighting fixtures.

Consolidated Electric Lamp Co., 199 Fulton street, New York City, has completed negotiations for the leasing of property at 56 West 45th street, to facilitate operations.

Chicago Steel Foundry Co., 37th and Kedzie streets, Chicago, is enlarging its plant by the building of a brick addition 100 by 140 ft. A 3-ton electric furnace will be installed in the addition.

Stuart Products Corp., Chicago, manufacturer of "Make-UR-Own" batteries, having outgrown its former quarters at 440 South Green street, is now located at 665 West Washington boulevard.

R. Thomas & Sons Co., East Liverpool, O., manufacturer of transmission line insulators, is sending out a catalog on "Thomas Link-Type Hewlett" insulators, together with considerable general information and data.

Benjamin Electric Manufacturing Co., Chicago, has issued a large folder giving details, with illustrations, of the recent advertising campaign, called "Millions of Messages to Sell Millions of Plugs," in which the company used national magazines as a selling aid to "Benjamin" two-way plugs.

Peerless Light Co., Chicago, has moved its city sales department from 174 West Randolph street to quarters in the new building of the company at West Washington boulevard and Union street. Lester Henshell is in charge of the salesroom with Joseph W. Taylor at the head of the chandelier and fixture department.

Electric Storage Battery Co., Allegheny avenue and 19th street, Philadelphia, Pa., is sending out a small booklet containing facts for consideration in selecting a battery for electrical industry truck and tractor service, in which the good points claimed by the company for the "Ironclad-Exide" battery are pointed out.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., announces the appointment of Charles W. Doane as Detroit representative of the automobile equipment department of the company, with offices at 1109 Kresge building. Mr. Doane, who for several years was in charge of the Westinghouse automobile service department of the Detroit district, is succeeded in that capacity by A. B. Junker.

Fairbanks Co., Broome and Lafayette streets, New York City, has issued a 256 page catalog describing and illustrating the line of power transmission appliances and elevating and conveying machinery manufactured by the company. In addition, the catalog contains data as to dimensions, capacities, etc., making it a handy book for men who design or install machinery.

Packard Electric Co., Warren, O., has opened a sales office at Buffalo, N. Y., with L. W. Haig in charge as district sales manager. The increase of business in the Buffalo territory made it necessary for the company to have a direct factory representative

L. W. Haig.

at that point. Mr. Haig, after graduating from Purdue university, was employed by several large electrical concerns, specializing on the design of transformers, which together with a previous experience in testing, makes him well fitted to handle the "Packard" products.

Locomotive Electric Washing Machine Co. is the new name of the Remmert Manufacturing Co., Belleville, Ill. William Remmert has severed his connection with this company by disposing of his stock to the present management of which A. H. L. Kiimme is secretary. The company will use "Lewmco," pronounced "Loomco," as its trade name.

Philadelphia Storage Battery Co., Ontario and C. street, Philadelphia, Pa., has completed construction work on the first two floors of its new 3-story factory building and is already manufacturing on the first floor. Foundations have been laid for an additional 4-story concrete building, which the company expects to occupy in about 45 days.

Sun Light Carbon Co., Red Fork, Okla., will equip a plant for the manufacture of carbon and its products for use in electrical machinery. P. T. Peters, Lynch building, Tulsa, Okla., is secretary of the company.

Delta-Star Electric Co., Chicago, is sending to the trade its special publication No. 93 illustrating unit type outdoor high-tension substations for industrial service. Copies of the publication will be sent to interested parties on request.

Globe Manufacturing Co., Perry, Ia., manufacturer of "Quicker Yet" washing machines for hand, engine or electric power, is sending out an illustrated catalog giving descriptions and details of the various types of machines made by the company.

American Gas Machine Co., Albert Lea, Minn., manufacturer of the "Oscillator" vacuum washing machine for operation by electric energy and other methods, is sending out a booklet explaining the different types of machines made by the company.

Valley Electric Co., 794 Arcade building, St. Louis, Mo., has been organized with capital stock of $725,000 to manufacture electric motors, motor generators, battery chargers, etc. The company has acquired a plant and will erect seven 1-story buildings, 30x200 ft., of brick construction and three 2-story buildings, 40x400 ft., of concrete construction. S. A. Whitten is president, E. C. Ballman, vice-president, George M. Elliott, secretary and Herbert Elder, treasurer of the new company.

Booth Electric Furnace Co., Chicago, announces the consolidation of the executive and sales offices with the engineering and production office at 326 West Madison street. The company also reports a number of additions to its sales and engineering staffs. B. G. Tarkington, formerly industrial heating engineer of the Hodenpyl-Hardy Co., Jackson, Mich., is now district sales manager at Chicago for the Booth company. An office at Sydney, Australia, has been opened with Bartholomew Bannon, 321 Pitt street, in charge.

American Ever Ready Works of National Carbon Co., Inc., Long Island City, N. Y., manufacturer of the "Daylo Eveready" lamp announces a $10,000 prize contest that will be open to competition during June and July. The contest takes the form of a window display to be shown by "Daylo Eveready' dealers in all parts of the country in which the central figures are a man holding a "Daylo Eveready" lamp and the woman a letter. The prize will be awarded to those sending in the best answers, limited to 12 words, suggesting uses to which the lamp may be put. The first prize will be $3000, or $250 a word to the lucky winner.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

VERNON WILDER has been appointed general superintendent of the Interstate Telegraph Co., with headquarters at Bishop, Cal.

G. C. WARD has been elected a vice-president and will be in charge of operation and construction for the Southern California Edison Co.

W. D. BALDWIN, chairman of the board of directors of the Otis Elevator Co., New York City, recently sailed on a business trip to Europe.

CHARLES G. DUBOIS, president of the Western Electric Co., New York City, has been elected a director of the Chase Securities Corp., New York City.

C. A. NASH, Davenport, Ia., has been placed in charge of the activities of the new business managers of the Tri-City Railway & Light Co., Davenport, Ia.

H. A. JOSLIN, manager of the Dallas, Ore., division of the Mountain States Power Co., has been elected president of the Dallas Commercial Club.

F. E. PETIT, of the legal staff of the Southern California Edison Co., has resigned to accept a position as assistant general counsel of the Salt Lake railroad.

HAROLD B. VINCENT, formerly management engineer of the Day & Zimmerman Co., Philadelphia, has been promoted to commercial engineer of the same company.

LAFAYETTE HANCHETT has been elected president of the Utah Power & Light Co., Salt Lake City, Utah. He succeeds D. C. Jackling, who resigned a short time ago.

GEN. GEORGE H. HARRIES, vice-president of H. M. Byllesby & Co., Chicago, delivered an address at a meeting of bankers of Iowa and Nebraska, at Ottumwa, Ia., May 12.

H. N. AIKMAN, recently with Dwight P. Robinson & Co., New York City, has resigned to become engineer in charge of steel work with the Fargo Engineering Co., Jackson, Mich.

BRYANT WHITE has been appointed general superintendent of the light and power departments of the Roanoke (Va.) Railway & Electric Co., and the Lynchburg (Va.) Traction & Light Co.

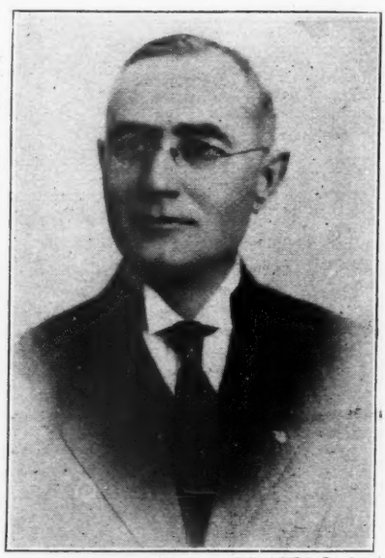
F. S. MILLS, electrical engineer connected with the western office of the National X-Ray Reflector Co., Chicago, is now engaged in special research work in illumination with the Famous Players-Lasky Corp.

WILLIAM K. SANDERSON, chairman of the St. Thomas (Ont.) Hydro-Electric Utilities Commission, was elected president of the Ontario Municipal Electric Association at the recent annual convention of the association.

HOWARD S. PHELPS has accepted a position in the engineering department of the Philadelphia Electric Co., Philadelphia, Pa. He was formerly electrical engineer for the Iowa Railroad Commission.

JOHN A. LAWRENCE, formerly assistant mechanical engineer of the New York Edison Co., New York City, has assumed the position of engineering manager for Thomas E. Murray, Inc., New York City.

CHARLES J. GRIFFITH, general manager of the Little Rock Railway & Electric Co., who was elected president of the Arkansas Utilities Association at



Charles J. Griffith.

its recent convention in Hot Springs, Ark., has long been connected with public utility companies in Arkansas and is well known throughout the entire state. Mr. Griffith, in addition to being general manager, is also purchasing agent of the Little Rock company.

CHARLES D. STEENBURGH, purchasing agent of the North East Electric Co., Rochester, N. Y., for the past eight years, has resigned to accept a similar position with the Rochester Can Co., Rochester, N. Y.

J. N. LAPOINTE, president of the J. N. Lapointe Co., New London, Conn., has been elected president of the Arnold Electric Tool Co., West Haven, Conn., succeeding Frederick Levere, who recently resigned the position.

GRAHAM CLAYTOR has been appointed assistant to the general manager of the Roanoke (Va.) Railway & Electric Co., and the Lynchburg (Va.) Traction & Light Co. Mr. Claytor has been with the companies since 1907 and was formerly general superintendent of the light and power departments.

F. P. VOSE, Chicago, secretary of the National Electric Credit Association, has returned to Chicago after a tour of the Pacific Coast states.

ROBERT MONTGOMERY, manager of the commercial department of the Louisville Gas & Electric Co., Louisville, Ky., has been elected a director of the Louisville Rotary Club.

H. G. HARVEY has accepted a position in the commercial department of the Pennsylvania Utilities Co., Easton, Pa. Mr. Harvey was formerly commercial engineer of the Nassau Light & Power Co., Mineola, L. I.

GEORGE H. WILMARTH, general manager of the Muskogee Gas & Electric Co., Muskogee, Okla., has been made a director of the Oklahoma Free State Fair Board and has been elected vice-president of the Muskogee Rotary Club.

HARRY DEVERELL has severed his connection with Deverell, Spencer & Co., Baltimore, Md., and has opened offices in Baltimore as a sales engineer for machinery, especially elevating, conveying and power transmission machinery.

D. E. CARPENTER, formerly of the Westinghouse Electric & Manufacturing Co. branch office at Detroit, has joined the forces of the Buckeye Products Co., Cincinnati, and will be in charge of the sales of Booth furnaces in that district.

FRED A. NOBBE, assistant secretary and treasurer of the Louisville (Ky.) Gas & Electric Co., was recently presented with a watch by his associates in the company, the occasion being the completion by Mr. Nobbe of 48 years of service with the company.

J. C. MCLAUGHLIN, formerly manager of the commercial department of the Potomac Electric Power Co., Washington, D. C., has resigned to engage in the business of retailing electrical supplies. Mr. McLaughlin was with the Potomac company for 30 years.

DR. LAMAR LYNDON, consulting engineer, 13 Park Row, New York City, who has been out of the country for the past three months, spending most of the time in the Caribbean Sea, visiting Havana, Colon, Panama, Bocas, Almirante, returning home via New Orleans, has resumed his practice. Dr. Lyndon took the trip as a holiday to obtain a much needed rest, after the pressure of work he had been under during the preceding two years.

OBITUARY.

GUY M. FREER, executive secretary of the National Industrial Traffic League, died recently in Chicago after a brief illness of pneumonia. He was born in Ohio in 1872 and was president of the league until a few months ago, when he was appointed executive secretary.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Rutland, Vt.—The Vermont Hydro-Electric Corp. is understood to be considering plans for the construction of an additional unit at its hydro-electric plant, now nearing completion at Mill Village.

Woonsocket, R. I.—The Belmont Woolen Co., East Mill street, has inaugurated work on the construction of a boiler plant at its works, about 20 by 40 ft., of brick type, for increased power facilities.

Meriden, Conn.—The Connecticut Telephone & Electric Co., Inc., has filed notice of an increase in its capital stock from $650,000 to $2,000,000, for general business expansion.

New Haven, Conn.—The United Illuminating Co., Grand avenue, has awarded a contract to C. W. Murdock, Inc., for the construction of a 1-story brick addition to its power plant. The structure will be about 68 by 75 ft., and will be equipped as an extension to the turbine room.

Albany, N. Y.—Bids will soon be called by Charles F. Rattigan, state superintendent of prisons, for electrical work, water supply, etc., for Sing Sing prison, Ossining, N. Y.

Binghamton, N. Y.—The Binghamton Light, Heat & Power Co. is understood to have completed plans for the installation of two new 4500-kv-a. banks of transformers for increased capacity. The company has been awarded a contract for the furnishing of electric energy for light, heat and power purposes by the village of Union for a period of five years.

Brooklyn, N. Y.—Stephen Ransom, Inc., 401 West street, New York City, has awarded a contract to the Wharton Green Co., 37 West 39th street, New York City, for the construction of a new transformer building at Hamilton street, South Brooklyn district. The structure is estimated to cost about $25,000.

Buffalo, N. Y.—The city council has authorized an immediate investigation as to the desirability of constructing a municipal hydroelectric power plant for the generation of electric energy from the Niagara river. It is understood that plans are under consideration for the retaining of an expert to report on plans for a municipal distribution system for the city.

Brooklyn, N. Y.—Notice has been filed by the Triangle Conduit Co., 50 Columbia Heights, manufacturer of conduit specialties, etc., of an increase in its capital stock from $30,000 to $100,000.

Brooklyn, N. Y.—J. M. Huber, 602 62nd street, has completed arrangements for the construction of a plant for the manufacture of carbon black, etc., to be located at Swartz, La. Large quantities of electrical and mechanical equipment will be utilized, it is understood, and the project is estimated to represent an investment of about $300,000.

Lancaster, N. Y.—The Depew & Lancaster Light, Power & Conduit Co. has completed arrangements for the issuance of notes for $100,000, a portion of the proceeds to be used, it is understood, for the inauguration of work on the proposed expansion program.

New York, N. Y.—The Durbrow & Hearne Manufacturing Co., 12 Wooster street, manufacturer of coil hardening equipment, etc., has filed notice of the dissolution of the company.

New York, N. Y.—The American Telephone & Telegraph Co., 195 Broadway, has awarded a contract to Marc Eidlitz & Son, 30 East 42nd street, for the construction of a new annex to the telephone and telegraph building at 201 Broadway.

New York, N. Y.—The New York Telephone Co., 15 Dey street, has completed plans for alterations and improvements, as well as additions to existing telephone exchange plants at various locations. The work includes, a 6-story addition to the plant at 61 Irving place, with alterations, estimated cost $80,000; alterations and improvements in the telephone exchange plant at Bayport and Central avenues, Far Rockaway; 4-story addition to old station at 14th avenue and 41st street, Brooklyn; and contracts have been let for a new exchange plant at 237 East 30th street, to cost $600,000; alterations in the central office building at 51 Franklin street, to cost $25,000; and improvements in the building at 30 Gold street, to cost $15,000.

Northport, N. Y.—The Long Island Lighting Co. is understood to be considering plans for the extension of its electric transmission system to a section of the town of Brookhaven, Suffolk county. Application for permission to proceed with the work has been filed with the State Public Service Commission.

Bloomfield, N. J.—The Simms Magneto Co., Arlington avenue, has had plans prepared for the construction of a plant, estimated to cost about $28,000.

Bloomfield, N. J.—The American LaFrance Engine Co. has filed plans for the construction of a power plant on Brookside place, to be used for factory service in connection with its local works, now in course of erection. The power plant is estimated to cost $75,000, including equipment.

Butler, N. J.—The borough council has approved plans and specifications for an addition to the municipal electric plant, estimated to cost about $60,000. The plans will be submitted at once to the State Board of Public Utility Commissioners for approval.

Camden, N. J.—The Wilckes, Martin, Wilckes Co., 135 William street, New York City, manufacturer of lamp black, etc., has had plans prepared for the construction of two buildings at its local plant. The structures will be two and 3-story, about 64 by 79 ft., and 35 by 75 ft., respectively.

Dover, N. J.—The New Jersey Power & Light Co. has been granted permission by the State Board of Public Utility Commissioners to issue preferred stock for $100,000, as well as bonds for $152,000, a portion of the proceeds to be used, it is understood, for improvements and extensions.

Dover, N. J.—The Dover Boiler Works has recently completed the installation of new motor equipment, to be utilized in connection with its hydraulic pumping apparatus. Contract has been awarded to the New Jersey Power & Light Co. for a total of 150 hp. for operation.

Dover, N. J.—The city has recently completed the installation of new equipment at the municipal pumping station, about 75 hp. in motors being required for operation.

Elizabeth, N. J.—The American Marine Equipment Corp., 1064 East Grand street, has had plans prepared for the construction of a boiler shop at its local works. The structure will be of brick and steel construction.

Elizabeth, N J.—The Union County Board of Freeholders is considering the issuance of bonds for $68,000, the proceeds to be used for the installation of new lighting, fire alarm, heating and water systems at the Bonnie Burn sanatorium.

Hammonton, N. J.—The town council has contracted with the Hammonton Electric Light Co. for the furnishing of electric energy for street-lighting purposes for a period of five years.

Jersey City, N. J.—The Hudson County Board of Freeholders has passed an ordinance granting permission to the New York Telephone Co. to utilize a portion of the Paterson Plank road for extensions in its system. This work has been approved by the State Board of Public Utility Commissioners.

Paterson, N. J.—The Weidman Silk Dyeing Co., Fifth avenue, has awarded a contract for the construction of a power plant at its local works. The John W. Ferguson Co., 152 Market street, is the contractor.

Allentown, Pa.—J. E. Edwards, formerly in charge of the engineering department of William H. Taylor &

Co., recently established the firm of J. E. Edwards & Son, 610 Hamilton street. The company will specialize in power plant installation, heating and ventilating work, etc.

Catasauqua, Pa.—The town council is understood to be arranging plans for the electrification of the municipal waterworks plant, steam motive power heretofore being in service. Estimates of cost, etc., are now being made.

Harrisburg, Pa.—Arrangements are being made, it is understood, for the installation of automatic telephone equipment throughout the Bell telephone system in Pennsylvania, the entire work which will be completed within a period of about four years, being estimated to cost $15,000,000. F. J. Chesterman is the chief engineer of the company.

Philadelphia, Pa.—Frank Schoble & Co., Tenth and Oxford streets, are having plans prepared for the construction of a boiler at their works.

Philadelphia, Pa.—The Philadelphia & Reading Coal & Iron Co. is said to be considering plans for the electrification of its various collieries.

Philadelphia, Pa.—The finance committee of the city council has approved the issuance of bonds for $4,000,000, the proceeds to be used for equipment for the Frankford elevated railway line. Transit Director Twining is in charge of the project.

Philadelphia, Pa.—The Philadelphia Rapid Transit Co., Land Title building, has had plans prepared for extensions and improvements in its mechanical buildings and car barns on Germantown avenue, to cost about $75,000.

Philadelphia, Pa.—The Keystone Co. has awarded a contract for the erection of a 1-story brick building on Marvine street, near Columbia avenue, to cost about $15,000.

Philadelphia, Pa.—The Philadelphia Electric Co., Tenth and Chestnut streets, has awarded miscellaneous contracts in connection with the construction of the 2-story Franklin substation, to be located at 52 North Sixth street, to cost about $50,000. Contract for the erection of the structure was recently awarded to the John R. Wiggins Co., Otis building.

Pittsburgh, Pa.—The Monongahela Valley Traction Co. has been granted a federal permit to construct a 22,000-volt transmission line in Monongalia county, W. Va.

Shamokin, Pa.—Arrangements are being made by the Pennsylvania Lighting Co. and the Lehigh Power Securities Corp. for a merger of the various properties controlled by these organizations, the organization to be provided with a capital of $5,000,000. Application will be made to the State Public Service Commission for permission to perfect the merger.

Wilmerding, Pa.—At the annual meeting of stockholders of the Westinghouse Airbrake Co., the following were elected directors for the ensuing year: B. V. Becker, J. D. Callery, E. M. Herr, A. L. Humphrey, J. F. Miller, J. R. McCune, J. R. McCindey, Charles McKnight, M. S. Rosenwald, W. D. Updegraff, and H. H. Westinghouse.

Smyrna, Del.—The Charles Warner Co. has completed negotiations for the purchase of the plant of the Smyrna Gas & Power Co. The new owner is understood to be planning for enlargements and extensions to increase the present service.

Annapolis, Md.—A number of bills recently introduced in the State legislature, have been signed by Governor Ritchie. Among these are: Senate bill No. 429, authorizing the commissioners of Thurmont, Federick county, to arrange for funds for the improvement of the municipal electric light and power plant; bill authorizing an appropriation of $50,000 by the town council of Oakland, to be used for lighting purposes; House bill No. 86 authorizing the county commissioners of Queenstown, to construct and operate an electric light plant; House bill No. 224, authorizing the commissioners of Oxford to maintain and operate an electric light and power plant; Senate bill No. 357 authorizing the council of Snow Hill to purchase and maintain the local existing electric light plant.

Baltimore, Md.—The Reliable Furniture Co., 303 President avenue, has had plans prepared for the construction of a power plant to be used for general factory service in connection with the erection of the proposed works of the company on Wilkens avenue.

Emmittsburg, Md.—The board of managers of Mount St. Mary's College is having plans prepared for the construction of a 1-story steam-operated electric power plant at the institution, estimated to cost about $25,000.

Bedford, Va.—The city is having plans prepared for the construction of a new municipal, hydroelectric plant, with dam, estimated to cost about $100,000. W. C. Whitner & Co., Virginia Railway & Power building, Richmond, is the engineer.

Newland, N. C.—The Newland Light & Power Co., recently incorporated with a capital of $25,000, is planning for the construction of a plant and transmission system, for service in Newland and vicinity. E. C. Guy is the manager of the company.

Columbia, S. C.—The city is having plans prepared for extensions and improvements in the municipal electric street-lighting system. The work is estimated to cost approximately $20,000. W. H. Harth is the city electrician.

Elberton, Ga.—The Elberton Oil Mills contemplates the construction of a power plant. J. T. Dennis, Jr., is the manager of the plant.

Pearson, Ga.—The city has approved the issuance of bonds for $30,000, the proceeds to be used for the installation of new electric light and water systems for municipal service.

Kissimmee, Fla.— The Southern Utilities Co. is understood to be arranging to increase its capital stock to $2,500,000, to provide for general business expansion.

NORTH CENTRAL STATES.

Mansfield, O.—The Ohio Brass Co. will erect a malleable brass foundry with a floor space of 80,000 sq. ft.

Springfield, O.—The Steel Products Engineering Co., has commenced the erection of a 1-story addition, 62 by 153 ft., at Columbia and Isabella streets.

Indianapolis, Ind. — Stevenson Gear Co. will erect a new building to house 60 gear-cutting units that will give employment to about 400 persons.

Indianapolis, Ind.—The Federal Steel Products Co. has increased its capital stock from $100,000 to $500,000.

Terre Haute, Ind.—The Freeman-Riff Co., Chicago, manufacturer of conveying machinery and mine supplies, has bought a site and will erect a plant at Terre Haute.

Detroit, Mich.—The General Metals Co. is planning the expansion of its plant and the purchase of additional equipment. The company recently increased its capital stock from $100,000 to $250,000.

Detroit, Mich.—The Detroit Twist Drill Co. is to build an addition to its plant, 100 by 112 ft., at an estimated cost of $60,000.

Detroit, Mich.—Dodge Brothers, manufacturers of automobiles, will commence the immediate erection of an 8-story brick and steel factory, 75 by 266 ft.

Grand Rapids, Mich.—The Grand Rapids Textile Machinery Co. will build a 1-story addition to its plant, 80 by 115 ft., at an estimated cost of $20,000.

Jackson, Mich.—The Walcott Lathe Co. is preparing plans for a 2-story brick, steel and concrete addition, 60 by 150 ft., at an estimated cost of $150,000.

Chicago, Ill.—The Hafner Manufacturing Co., 400 North Lincoln street, manufacturer of toys, is having plans prepared for a 1-story plant, 66 by 160 ft., on Carroll avenue, near North Kedzie street. The plant is estimated to cost $50,000.

Chicago, Ill.—Harry E. Pridmore, 1901 South Rockwell street, manufacturer of presses and other machinery, is having plans prepared for a 1-story foundry addition, 60 by 160 ft., to cost about $100,000, including equipment.

Grand Rapids, Wis.—The Consolidated Water Power & Paper Co. will erect and equip a hydraulic water power plant addition, 40 by 60 ft., at an estimated cost of $64,000. L. A. DeGuere is the consulting engineer on the project.

Milwaukee, Wis. — The Western Metal Specialty Co., 102 Wisconsin street, has increased its capital stock from $75,000 to $100,000 and is enlarging its plant on St. Paul avenue.

West Bend, Wis.—The West Bend Aluminum Co. has awarded a contract to the Northern Construction Co., Milwaukee, Wis., for a 3-story extension, 60 by 100 ft., and a warehouse addition, to cost about $100,000, including equipment.

St. Louis, Mo.—The Wood & Lane Co., is reported to be in the market for a horizontal automatic steam engine and a 25 to 30-kw., 250-volt, d-c. generator, to be used direct-connected to the engine.

SOUTH CENTRAL STATES.

Memphis, Tenn. — The Western Union Telegraph Co. will erect a 3-story office building, 75 by 150 ft., estimated to cost $250,000.

Nashville, Tenn.—The Mohrlite Co. of America has plans prepared for the construction of a $300,000 plant in Nashville. The headquarters of the company are in Urbana, O. W. M. Dixon is the manager of the company.

Birmingham, Ala.—The Concrete Steel Co., Brown-Marx building will erect a plant costing about $150,000 to include a 1-story machine shop, 75 by 200 ft. An electrically operated traveling crane will be installed. William Piez is the local manager of the plant.

Jackson, Ala.—Bolen Brothers plan to establish an electric light plant, cotton gin and sawmill at Jackson in the near future.

Edwards, Miss.—The town has voted $7,500 in bonds for the purpose of establishing an electric light and power plant. H. A. Cannada is the town clerk.

Lafayette, La.—Arrangements are being made by the city for extensive improvements and enlargements in the municipal electric light and waterworks systems, for increased operations.

Monroe, La.—The Peddicord Motor Supply Co. will build a plant and install electrically driven equipment for the manufacture of automobile accessories. T. H. Peddicord is president and general manager of the company.

Stephens, Ark.—The city plans to install an electric light plant. For further information address mayor, Stephens, Ark.

Okmulgee, Okla. — The Creek Hotel Co. will erect an 8-story hotel, 100 by 140 ft., of reinforced concrete construction, at an estimated cost of $750,000.

Tulsa, Okla.—The Middle West Utilities Co. will construct a new generating station.

WESTERN STATES.

Everett, Wash. — Everett Timber Co. has started work in electrifying its Everett mill. An Allis-Chalmers 750-kw. steam turbine of the mixed-pressure type will be installed and will provide electrical energy for the operation of the planing mill and other machinery.

Seattle, Wash. — Ordinances have been introduced in the city council appropriating $150,000 for the city lighting department.

Toppenish, Wash.—The city is considering plans for the immediate installation of a curb electric-lighting system throughout the business district. Lighting units of 400-cp. capacity will be utilized for the work.

Toppenish, Wash. — The Pacific Fruit & Produce Co. has recently inaugurated work on the construction of a cold storage and warehouse plant in the vicinity of Wapato. The structure will be about 250 by 300 ft., and large quantities of refrigerating apparatus, electrical equipment, etc., will be utilized.

Wapato, Wash.—Wapato Fruit & Cold Storage Co. is making rapid progress on the construction of a new addition to its cold storage plant. The structure will be 2-story and basement about 100 by 100 ft., and considerable electrical equipment, refrigerating apparatus, etc., will be utilized in the extension.

Yakima, Wash.—The Pacific Power & Light Co. has recently completed work on the extension of its power lines from Naches City for about a distance of 2 mi. The lines are to be utilized for the furnishing of power for irrigation purposes.

Salem, Ore.—Oregon Electric Co. plans to make improvements costing $10,000 in its plant.

Tongue Point, Ore.—The United States Government, Navy Department, is understood to be having plans prepared for the construction of a large wireless station on property recently acquired in the vicinity of Tongue Point.

Alameda, Cal.—The city council has plans prepared for the construction of a 1-story reinforced concrete electric substation, to be used for municipal service.

Bakersfield, Cal.—The San Joaquin Light & Power Co. is planning to inaugurate work at once on the construction of a steam plant in the vicinity of Elk Hills. The initial unit of the proposed plant will have a capacity of about 20,000 hp., and is estimated to cost in excess of $1,500,000.

Los Angeles, Cal.—The city council has recently adopted ordinances providing for the installation of new ornamental type electric street-lighting systems on a number of the main business streets of the city.

San Bernardino, Cal.—The Southern Sierras Power Co. is understood to be having plans prepared for the construction of a transmission line to extend to the Apple and Lucerne valleys sections, a distance of about 20 mi., as well as a similar line to the Hinkley district, about 10 mi.

San Francisco, Cal.—The Pacific Fruit Express Co., Southern Pacific building, has completed arrangements for the construction of an icing plant at Sparks, Nev. estimated to cost approximately $370,000. Large quantities of refrigerating apparatus and electrical machinery and equipment will be utilized.

San Mateo, Cal.—The trustees are considering plans for the immediate installation of electrolier system throughout the business section of the city.

INCORPORATIONS

New York, N. Y.—Universal Fire & Burglar Alarm Co. Capital stock, $50,000. To manufacture electrically operated burglar and fire alarm systems. Incorporators. H. Hubert, J. A. Bolles, and C. O. Winne, 443 41st street, Brooklyn.

New York, N. Y.—Superior Electrical Fixture & Appliance Co.. Capital stock, $10,000. To manufacture electrical fixtures, appliances, etc. Incorporators: A. and H. and I. Fistel, 332 Bedford avenue, Brooklyn.

New York, N. Y.—Storage Battery & Electric Co. Capital stock, $25,000. To manufacture electrical goods, storage batteries, etc. Incorporators: R. T. Springer, E. M. Jacquet, and Reuben Breakman.

New York, N. Y.—R. A. Byrnes Co. Capital stock, $5000. To manufacture electrical equipment. Incorporators: H. Dougherty, R. A. Byrnes, and A. H. Schuyler, 404 Riverside drive.

Brooklyn, N. Y.—Myley Electrical Supply Co. Capital stock, $10,000. To manufacture electrical supplies, etc. Incorporators: N. Cohan, M. Schier, and M. Levy, 54 Lenox avenue.

Brooklyn, N. Y.—United Electric Sales Corp. Capital stock, $25,000. To operate electric welding plants, etc. Incorporators: Robert N. Chambers, Sedgewick, New York City; Robert A. Cumming, Bronxville; and R. F. Shepard, Brooklyn.

Irondequoit, N. Y.—Hickson Electric Co. Capital stock, $50,000. To manufacture electrical goods. Incorporators. C. Klein, G. P. and L. Hickson, Irondequoit.

Newark, N. J.—A. & R. Lamp Co. Capital stock, $125,000. To manufacture electric lamps, etc. Incorporators: Arthur J., William J. and M. Rainaud.

Plainfield, N. J.—Hysig Co. Capital $20,000. To manufacture electric bells, and other electric goods. Incorporators: M. P. Stadele, G. E. Hudson, and H. F. Hoffman, Plainfield.

Newark, N. J.—Hercules Manufacturing Co., 84 Warren street. Capital stock $125,000. To manufacture engines, etc., and parts. Incorporators: C. W. and S. E. Curtiss and John E. Gunning.

Womelsdorf, Pa. — Womelsdorf, Myerstown & Lititz Transit & Light Co. Capital stock $1,700,000. To operate electric light plants and other utilities. Incorporators: M. C. Kelly, M. L. Horty, and S. L. Mackey, Wilmington, Del.

Somerset, Va.—Somerset Light & Power Co. Capital stock, $65,000. To operate an electric plant and distribution system for Orange, Green, Madison and Louisa counties. W. G. Buckner, president; D. F. Weaver, secretary.

Wilmington, N. C.—Simmons Hand Stoker Co. Capital stock $100,000. To manufacture hand stokers. Incorporators: C. E. Hooper, Wilmington; L. H. Simmons, Goldsboro, N. C., and W. J. Thomas, Philadelphia, Pa.

Sheboygan, Wis. — The Citizens Telephone Co. has been incorporated with capital stock of $300,000.

Boston, Mass.—The Gainaday Co. of Maine has been incorporated to manufacture electrical specialities with capital stock of $30,000. John W. Lockerbie and Charles W. Lovett, Marblehead, Mass., and Claude M. Quick, Boston, are the incorporators.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

United Electric Light Co. Will Issue 8000 Shares of New Stock.

The United Electric Light Co., Springfield, Mass., has received permission from the Department of Public Utilities to issue 8000 new shares of $100 par. The stock will be issued at $170 a share, to yield $1,360,000. The proceeds will pay indebtedness, incurred through permanent additions, extensions and improvements to plant and properties.

Kellogg Switchboard & Supply. Co.

The balance sheet of the Kellogg Switchboard & Supply Co., as of Dec. 31, 1919, compares with the same date, 1918, as follows:

ASSETS.	1919.	1918.
Plant equipment, etc..	$ 627,182	$ 640,688
Patents and good will	879,389	883,107
Cash	65,868	213,975
Accounts received and investments	1,604,854	1,325,301
Liberty bonds	372,231	368,965
Inventories	2,950,827	2,993,187
Unearned insurance premiums and sundries	9,264	28,842
Total	$6,509,615	$6,454,065
LIABILITIES.		
Capital stock	$4,000,000	$4,000,000
Pay roll and Federal taxes, etc.	310,819	280,571
Trade and miscellaneous accounts	198,278	515,179
Surplus and reserve..	2,000,518	1,658,315
Total	$6,509,615	$6,454,065

Pacific Power & Light Co.

The earnings of the Pacific Power & Light Co., a subsidiary of the American Power & Light Co., for February and the twelve months ended Feb. 29, 1920, compares with 1919 as follows:

	1920.	1919.
February gross	$ 200,588	$ 159,469
Net after taxes	96,318	73,381
Total income	97,185	75,307
Surplus after charges	52,750	29,133
Twelve months' gross	2,252,602	1,890,769
Net after taxes	1,084,397	861,801
Total income	1,093,913	868,025
Surplus after charges	557,543	351,463
Balance after preferred dividends	367,124	162,463

Duquesne Light & Power Co.

The earnings of the Duquesne Light Co. and subsidiary companies for March and the three months ended March 31, 1920, compare with 1919 as follows:

	1920.	1919.
March gross	$1,271,176	$ 999,240
Net earnings	432,934	310,276
Three months' gross.	3,826,418	3,188,471
Net earnings	1,378,898	1,233,494

Southern California Edison Co.

	1920.	1919.
March gross	$ 866,470	$ 732,384
Net after taxes	506,867	453,221
Surplus after fixed charges	243,630	181,407
Twelve months' gross.	10,906,893	9,076,920
Net after taxes	6,037,599	5,678,265
Surplus after fixed charges	2,972,966	2,656,177

Cumberland County Power & Light Co.

	1920.	1919.
March gross	$ 226,296	$ 202,919
Net after taxes	40,763	46,836
Surplus after charges	15,242	9,598
Twelve months' gross.	2,851,812	3,156,626
Net after taxes	946,147	979,351
Surplus after charges	277,057	165,915
Balance after preferred dividends	139,057	27,915

Utah Power & Light Co.

The combined earnings of the Utah Power & Light Co. and the Western Colorado Power Co. for February and the twelve months ended Feb. 29, 1920, compare with 1919 as follows:

	1920.	1919.
February gross	$ 538,260	$ 482,996
Net after taxes	242,017	262,510
Total income	253,367	270,578
Surplus after charges	112,957	127,877
Twelve months' gross	5,781,317	5,610,670
Net after taxes	2,767,578	2,973,602
Total income	2,884,898	3,105,810
Surplus after charges	1,223,822	1,380,596
Balance after preferred dividends	648,366	861,869

Tennessee Power Co.

	1920.	1919.
March gross	$ 193,406	$ 208,594
Net after taxes	88,427	103,392
Surplus after interest charges	35,219	51,417
Twelve months' gross.	2,107,504	2,387,029
Net after taxes	824,306	964,262
Surplus after interest charges	178,322	328,394

Tennessee Railway, Light & Power Co.

	1920.	1919.
March gross	$ 527,565	$ 485,761
Net after taxes	198,271	209,552
Twelve months' gross	5,677,797	5,634,860
Net after taxes	2,033,766	2,324,231

Portland Railway, Light & Power Co.

	1920.	1919.
March gross	$ 747,154	$ 736,167
Net after taxes	215,582	294,190
Twelve months' gross	8,684,531	8,005,241
Net after taxes	2,976,558	2,635,947

American Power & Light Co.

The earnings of the subsidiary companies of the American Power & Light Co. for February and the twelve months ended Feb. 29, 1920, compare with 1919 as follows:

	1920.	1919.
February gross	$1,641,155	$1,330,212
Net after taxes	639,434	524,436
Twelve months' gross.	16,992,839	14,155,619
Net after taxes	6,490,218	5,363,084

Idaho Power Co.

	1920.	1919.
February gross	$ 150,665	$ 118,655
Net after taxes	71,476	50,369
Total income	77,306	54,017
Surplus after charges.	38,986	16,765
Twelve months' gross	1,877,799	1,532,340
Net after taxes	921,565	711,168
Total income	990,610	754,529
Surplus after charges	526,742	308,320
Balance after preferred dividends	457,542	256,973

Nashville Railway & Light Co.

	1920.	1919.
March gross	$ 314,250	$ 267,284
Net after taxes	79,261	72,382
Surplus after charges	39,283	32,502
Twelve months' gross.	3,336,976	3,036,775
Net after taxes	792,789	943,688
Surplus after charges	317,261	464,976
Balance after preferred dividends	192,261	339,976

Dividends.

The Northern Texas Electric Co. has declared a dividend of $2 a share on the common stock, payable June 1 to stockholders of record May 20.

The Electric Investment Corp. has declared its regular quarterly dividend of 1¾% on the preferred stock, payable May 22 to stockholders of record May 12.

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeller & Co., Rookery Bldg., Chicago.

Public Utilities—	Div. rate. Per cent.	Bid May11.	Bid May 18.
Adirondack Electric Power of Glens Falls, common	6	10	10
Adirondack Electric Power of Glens Falls, preferred	6	70	70
American Gas & Electric of New York, common	10+extra	111	100
American Gas & Electric of New York, preferred	6	37	37
American Light & Traction of New York, common	..	150	141
American Light & Traction of New York, preferred	6	83	81
American Power & Light of New York, common	4	16	15
American Power & Light of New York, preferred	6	69	66
American Public Utilities of Grand Rapids, common	..	4	4
American Public Utilities of Grand Rapids, preferred	7	12	11
American Telephone & Telegraph of New York	..	99	94
American Water Works & Elec. of New York, common	..	2	2
American Water Works & Elec. of New York, particip	7	7	7
American Water Works & Elec. of New York, first preferred	..	40	40
Appalachian Power, common	..	1	1
Appalachian Power, preferred	7	15	14
Cities Service of New York, common	+extra	348	330
Cities Service of New York, preferred	6	67	65
Commonwealth Edison of Chicago	8	100	103
Comm. Power, Railway & Light of Jackson, common	..	19	19
Comm. Power, Railway & Light of Jackson, preferred	6	40	40
Federal Light & Traction of New York, common	..	6	5
Federal Light & Traction of New York, preferred	..	44	42
Middle West Utilities of Chicago, common	..	18	18
Middle West Utilities of Chicago, preferred	..	36½	36
Northern States Power of Chicago, common	..	42	41
Northern States Power of Chicago, preferred	ex.div.7	82	81
Pacific Gas & Electric of San Francisco, common	..	53	54
Public Service of Northern Illinois, Chicago, common	7	79	75
Public Service of Northern Illinois, Chicago, preferred	6	77	78
Standard Gas & Electric of Chicago, common	..	15½	15½
Standard Gas & Electric of Chicago, preferred	6	38	36½
Tennessee Railway, Light & Power of Chattanooga, common	..	1	1
Tennessee Railway, Light & Power of Chattanooga, preferred	6	4	3
United Light & Railways of Grand Rapids, common	4	21	19
United Light & Railways of Grand Rapids, preferred	6	59	59
Western Power of San Francisco, common	..	15	14
Western Union Telegraph of New York	extra	79	80
Industrials—			
Electric Storage Battery of Philadelphia, common	4	100	100
General Electric of Schenectady	8	170	170
Westinghouse Electric & Mfg. of Pittsburgh, common	7	53	53